PHOENIX GOODYEAR AIRPORT SUPERFUND SITE

FIELD INVESTIGATION REPORT

PHOENIX GOODYEAR AIRPORT/LORAL DEFENSE SYSTEMS

GOODYEAR, ARIZONA

SEPTEMBER 1990

VOLUME 1 OF 2

US Army Corps of Engineers
Omaha District

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF

November 8, 1990

Environmental Branch

Mr. Craig Cooper
U. S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Dear Mr. Cooper:

Enclosed are two (2) copies of the Field Investigation Report for the Phoenix-Goodyear Airport Soil Borings and Soil Gas Sampling Project implemented on the Loral property in February 1990. The report is also being sent directly to Goodyear Tire & Rubber Co., the State of Arizona Department of Environmental Quality and Water Resources, Loral, and the City of Phoenix.

Please contact Mr. Stan Bauer at telephone (402)-221-7767, if you have any questions regarding this report.

Sincerely,

Robert F. Smart
for S. L. Carlock, P.E.
Chief, Environmental Branch
Engineering Division

Enclosure

FIELD INVESTIGATION REPORT

PHOENIX-GOODYEAR AIRPORT SUPERFUND SITE

GOODYEAR, ARIZONA

Prepared by

U.S. Army Corps of Engineers
Omaha District

September 1990

Volume 1 of 2

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers, Omaha District (USACE) performed a subsurface drilling and sampling program at the Loral Defense Systems facility (formerly Goodyear Aerospace) at the Phoenix-Goodyear Airport (PGA) Superfund Site in Goodyear, Arizona. The field investigation was conducted in February 1990 for the purpose of quantifying volatile organic compound contamination in the unsaturated zone in areas of the facility that were previously untested. The purpose of this field investigation report is to only summarize the activities performed and present the analytical results.

Six (6) borings were drilled from the ground surface to the top of the water table, with soil samples collected at 5 foot intervals. Analytical results indicated trichloroethene (TCE) in samples from two borings. In boring PG90-5, located at the northwest corner of industrial building 1, low levels (74 - 110 mg/kg) of TCE were detected at a depth of 55 feet, corresponding to the top of the water table. Significantly higher levels of TCE were encountered in boring PG90-4, located at the southwest corner of industrial building 1. TCE was detected at depths of 15,20,25 and 55 feet ranging in concentration from 63 to 8700 mg/kg. The highest levels were encountered at a depth of 25 feet.

In four of the six borings drilled soil gas monitoring ports were installed. Dual ports were installed in the unsaturated zone at each location to measure soil gas concentrations from an upper fine grained zone and a lower coarse grained zone. Sampling and analysis was performed by Hydro Geo Chem in April 1990 in the newly installed ports and existing ports installed during previous investigations. A total of 22 soil ports were sampled by Hydro Geo Chem. The soil gas was analyzed for tetrachloroethene (PCE), trichloroethene, 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), carbon tetrachloride and chloroform. Analytical results indicated high levels (up to 3910 ug/l of 1,1-DCE) of volatile organic compounds in soil gas from ports in borings PG90-4 and 5. The report submitted by Hydro Geo Chem is included as an Appendix.

Shallow sediment samples were also collected in a surface water drainage on the airport property. These samples were collected to identify potential impacts due to transport of possible waste metals by runoff from the site.

One additional soil sample was obtained from a dross pile located near the newly constructed water treatment plant on airport property. Chemical analysis indicated high levels of metals (aluminum, cadmium, chromium, copper, iron, lead, manganese, nickel and zinc) as well as the presence of aroclor-1254.

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

APPENDICES

VOLUME I :

VOLUME II :

LIST OF TABLES

LIST OF FIGURES

FIGURE

1.0 SITE INVESTIGATION.

1.1 Introduction. A drilling and sampling program was conducted between February 4 to 21 for the Loral Defense Systems facility (formerly Goodyear Aerospace) at the Phoenix-Goodyear Airport (PGA) Superfund site in Goodyear, Arizona. The purpose of the investigation was to quantify contamination in the unsaturated zone in areas of the facility that were previously untested. These areas are suspected of containing significant levels of trichloroethene (TCE) and other volatile organic compounds (VOCs) based on information pertaining to past facility operations, soil gas survey results, and a soil vapor extraction pilot study. This information is intended to be used to determine parameters for soil clean-up as well as provide information relevant to cost-share negotiations. To supplement the analytical data from soil samples obtained during the drilling and sampling program, soil vapor monitoring ports were installed in four of the borings drilled during the investigation to obtain soil vapor levels. In addition, shallow sediment samples were obtained in a surface water drainage way to identify potential impacts due to transport of waste metals by run off from the site.

1.2 Environmental Setting.

1.2.1 Location . The PGA study area covers a parcel of approximately 35 square miles of land in Maricopa County in the western part of the Salt River Valley, about 17 miles west of Phoenix, Arizona. The area of interest lies within section 16, as shown on Figure 1. Except for the airport, which is owned by the City of Phoenix, the remainder of the PGA site lies almost entirely within the City of Goodyear. Industrial facilities of the Loral Corporation (formerly Goodyear Aerospace Corporation) and Unidynamics-Phoenix, Inc. (UPI) and others are located east and north of the airport, respectively. The City of Avondale occupies about 2 square miles along the eastern border of the City of Goodyear. Figure 2 shows the site location, site boundaries, and major features.

1.2.2 Climate. The PGA site has a desert climate characterized by long, hot summers and short, mild winters. Relative humidity is low, particularly during early summer, and the rainfall averages about 7.1 inches per year. The average daily maximum temperature in July is 107^{o}F, the average daily minimum temperature in January is 34^{o}F, and the average yearly temperature is 70^{o}F.

1.2.3 Physiographic and Geologic Setting. The PGA site lies in a desert valley west of Phoenix, Arizona. The land surface slopes very gently south-southwestward toward the Gila River. Broad swales and washes act as the primary surface drainage pathways. The valley occupies a graben filled with over 1000 feet of unconsolidated to semiconsolidated sediments over crystalline bedrock. This sediment was shed from surrounding mountain ranges which have been uplifted as horsts. These basin fill deposits are composed from bottom to top (older to younger) of a Lower Conglomerate Unit (LCU), a Middle Fine-Grained Unit (MFU) and an Upper Alluvial Unit (UAU) (see Figure 3).

The LCU overlies a basement complex of volcanic, metamorphic, and sedimentary rocks similar to the surrounding mountains. These basement rocks range in age from pre-Cambrian to Tertiary. The LCU consists variably of cemented sand, gravel, silt, and clay and is usually found at depths greater than 1,200 feet below land surface and extending to an unknown depth below the study area.

The MFU, overlying the LCU, consists predominantly of silty clay to sandy silt with lenses of silty sand. The top of the MFU is usually found between 300 and 400 feet below land surface in the vicinity of PGA, and the bottom extends to approximately 1,200 below land surface.

The UAU overlies the MFU and has been divided into three subunits, A,B, and C. Subunit A consists of gravels and sands from approximately 40 to 110 feet below land surface. From the surface to 40 feet, soils consist of clay with varying amounts of silt, sand and gravel. Subunit B extends from approximately 110 to 190 feet below land surface and consists of interbedded materials of which silt, clay, and silty sand predominate. Subunit C consists predominantly of sand and gravel with some silt and clay lenses extending from 190 to 320 feet below ground surface. Between 285 and 320 feet a moderately to well-cemented zone of sand with minor gravel and silt lenses overlies the MFU in Subunit C.

1.2.4 Hydrogeology. There are three major aquifer systems at the PGA site. Ground water is typically first encountered in Subunit A of the UAU, in an unconfined to semiconfined state, at a depth of approximately 50 to 60 feet below ground surface. The aquifer is composed of gravel, sands, and clays with some cobble layers. This aquifer is overlain by unsaturated silty, sandy, or gravelly clays and fine sands, and is underlain by a relatively continuous clay aquitard at approximately 110 feet below ground surface. Coarse sands and gravels, interbedded with silts and clays, comprise an intermediate confined aquifer system designated as Subunit C of the UAU. This aquifer yields significant amounts of water to wells in the area. A lower semiconsolidated clay-rich sand aquifer (MFU) is encountered at approximately 300 feet and is several hundred feet thick. This aquifer also yields significant water to wells.

1.3 History of PGA Site.

1.3.1 Site Description and History. The PGA site consists of an airport and industrial facilities including several large hangars and manufacturing buildings, which are currently being used. The airport is separated from the industrial facilities by a Southern Pacific railroad spur. The industrial plant on the east side of the spur belongs to the Loral Corporation who purchased the facility from Goodyear Aerospace Corporation (GAC) in 1987. The airport lies on the west side of the spur and is operated by the City of Phoenix. The Loral plant is currently used for manufacturing of defense related items. Many of the buildings on the airport are leased for industrial operations or training of airline personnel.

The Loral facility was originally built during the early 1940's by Goodyear aircraft as a defense plant. The neighboring airport began at approximately the same time as a Naval Air Facility. The Goodyear Aircraft facility essentially attained its current configuration during WWII with only minor building additions and modifications in subsequent years. The Navy added several buildings in the early 1950's including a large hangar, barracks, and other facilities.

Contamination was identified in wells in the area around the site in 1981 and the site was placed on the National Priorities List in 1984. There have been several rounds of sampling involving soil borings, well installation, and soil gas sampling conducted at the site. These investigations are documented in the final Remedial Investigation Report dated June 1989 prepared by EPA's contractor CH2M-Hill. Contamination has been identified in the Subunit A aquifer from the vicinity of the former GAC /Navy boundary and extending approximately 7000 feet to the southwest. Contamination has been also identified in Subunits B and C in the immediate vicinity of the former GAC/Navy boundary and in Subunit C at some distance from the airport. Work has been underway since March 1989 on an operable unit to clean contaminated ground water from Subunit A southwest of the main developed portion of the airport. The final remedy for other site contamination, including contaminated soils has been determined as stated in the Record of Decision dated September 1989.

1.3.2 <u>Previous Investigations and Results of Soil Sampling at the Loral Facility</u>. For a complete discussion of the previous soil sampling at the PGA site, refer to the final Remedial Investigation Report (CH2M Hill 1989). There have been three rounds of soil sampling intended to identify sources of volatile organic contamination at the PGA site. The first round was conducted in 1985 using hollow-stem augers and involved the drilling of twelve borings to ground water; six on each of the former Navy and Goodyear properties. The second round was conducted in the summer of 1987 using an air casing-hammer rig and involved drilling 19 borings to ground water. Ten of these borings were on former Navy property. Finally, a total of thirteen additional borings were drilled in November, 1987 according to the same sampling plan as the previous round. This last round involved drilling twelve borings on former Navy property and one on the railroad right-of-way which is the boundary between the two properties. All sampling rounds involved attempting to retrieve samples at approximately five foot intervals, although recovery in the coarse-grained zones was often poor. Figure 4 displays the locations of the previous sampling on the Loral facility.

The 1985 boring program attempted to investigate the soils near the hangar aprons, major open drains, and the soils adjacent to the most contaminated production well on the Navy property. It also attempted to confirm the presence of volatiles in the vicinity of several sludge drying beds and the building housing major degreasing operations at the former GAC facility. TCE was found at relatively low levels (less than 1000 ppb) in a boring drilled behind Goodyear building 16 which housed a vapor degreaser used in a plating shop. TCE was found in only one of five borings drilled in the old sludge drying beds at the GAC facility. This boring is only a few hundred feet from the boundary with the former Navy property and the TCE was found in every sample from that boring at concentrations less than 150 ppb. Goodyear has maintained in responses to EPA that no disposal of TCE occurred at the sludge drying beds.

The boring program conducted during the summer of 1987 intended to investigate the cause of high volatile compound concentrations in a soil gas survey at both the former Navy and Goodyear facilities. Only four of the nine borings drilled at the former GAC facility encountered contamination. The two borings which were drilled near the sludge drying beds were both free of TCE, as were three borings drilled at the locations of high TCE concentrations in soil gas along the northern edge of the former GAC property. Two borings, 0903 and 0908, were drilled near the two industrial buildings (Buildings 1 and 16) at the GAC facility which housed degreasing operations and both encountered TCE contamination. Boring 0903 encountered TCE for almost the entire soil column above ground water, including one sample at 2500 ppb. Two borings located in the drummed waste storage areas at the former GAC facility encountered low levels of TCE at depth. Concentrations were less than 260 ppb.

None of the borings drilled in November of 1987 were on Loral property. In general, no significant levels of volatiles were found in these borings above the influence of the contaminated water table, except for levels under 500 ppb found from 5 to 20 feet below grade from hole AC-4. This hole was drilled near a gate leading from the airport to the Loral facility near Yuma Road.

In 1988, a pilot soil vapor extraction system was run on Loral property near the southwest corner of Building 1 in the vicinity of holes 0903 and 0908. This pilot study is documented in Appendix S of the RI/FS. This pilot study involved soil vapor extraction from only one hole and indicated significantly larger quantities of TCE in soils than anticipated based on soil sampling results. Over 30 lbs. of volatiles were removed per day for much of the two-week test period. A similar pilot study was conducted in an area on the airport property with significantly lower quantities of TCE removed from the soil.

1.4 Drilling and Sampling Methodology.

1.4.1 Drilling Method and Equipment. All soil sampling was performed using a CME 75 drill rig and 6-inch O.D. (3 1/4-inch I.D.) hollow-stem auger (HSA) and center plug bit. Since all borings were located in areas of concrete pavement, coring was necessary prior to collection of samples. The pavement was cored using an 8-inch I.D. diamond core barrel. Potable water was used as the drilling fluid to cool the bit. The water was obtained from a City of Goodyear fire hydrant located on the airport property. The drill rig was carefully monitored for hydraulic leaks and repairs made when necessary. No leaks developed that would have contaminated the samples.

1.4.2 Sample Retrieval and Handling.

1.4.2.1 Soils

1.4.2.1.1 Sampling Equipment. All sampling for chemical analyses was done using a stainless steel split-spoon, 24 inches in length and 3 inches O.D. (2 3/8 inch I.D.). A steel sand catcher was also used to retain the sandy soil in the spoon. Spatulas and other utensils in contact with the sample during sample preparation were also constructed of stainless steel.

1.4.2.1.2 Downhole Sample Retrieval. Augers were advanced to the top of the designated interval at which time the center plug bit and drill rods were withdrawn from the hole. The center plug bit was replaced with a 3-inch O.D. stainless steel split-spoon and lowered by the drill rods to the sample interval through the hollow stem augers. The split-spoon was driven 18 inches (or to refusal) manually using a 300 pound weight falling 30 inches. The blow counts were recorded for every 6 inches the barrel penetrated the subsurface and recorded on the boring logs. If high blow counts (>50 for 6 inches) were observed, the sampler was driven as far as practical to obtain the necessary sample volume. After reaching the bottom of the sample interval the spoon and rods were withdrawn from the auger and the spoon removed from the rods by the geologist or a helper wearing clean nitrile gloves. These gloves were not worn during other drilling or sample handling activities and were stored in a clean location. The spoon was then taken to a sampling table set up near the drill rig and disassembled on a clean unused piece of aluminum foil by the geologist or assistant geologist wearing clean nitrile gloves. The time of opening the split-spoon was recorded and a small portion of soil was collected for field screening. The field screen was performed using an HNu PI-101 Analyzer with a 10.2 eV probe and calibrated using 40 ppm isobutylene calibration gas. The amount of sample recovery was measured and the appropriate grab samples and composite samples were taken from the spoon . The sample was described based on visual observations for logging purposes by the assistant geologist, while the site manager/geologist proceeded with sample preparation. Samples were taken for volatile organics and total organic carbon.

1.4.2.1.3 Borehole/Sample Screening. Prior to taking each split-spoon sample, the air quality at the top of the open auger was measured using an HNu meter, (as was the air quality in the breathing zone at that time). The background or ambient HNu reading representative of the site was determined prior to drilling at a location. For split-spoon samples where the sample volume allowed, a portion of the sample was placed in a new, clean plastic bag inside of a clean glass jar which was subsequently covered with foil. While the rest of the samples were processed and packaged, the sample in the foil-covered jar was allowed to offgas some of any volatiles present. Upon completion of the sample packaging for that sample, the headspace (air inside the foil-covered jar) was tested with the HNu by inserting the HNu probe through the foil. All HNu readings were noted on the log and differentiated as to type (i.e. headspace, top of augers, breathing zone, etc.).

1.4.2.2 Sediment Samples.

1.4.2.2.1 Sampling Equipment and Sample Retrieval. Sediment samples were recovered using a stainless steel cup attached by bolts to a steel pole. The cup was lowered through the water to the bottom of the center of the channel of the ditch. The sampling was done with field personnel standing on the bank of the ditch. The cup was forced down into the bottom sediments to retrieve the shallow sediments. The cup filled with sediment was raised slowly back through the water to the surface where it was transferred to a stainless steel bowl. Sediment was collected from three closely spaced points (20 feet apart) within the ditch, starting downstream first to minimize the affect of turbidity created by the sampling process. These subsamples were then composited in a stainless steel bowl and placed in the appropriate sample containers.

An additional soil sample was collected near the water treatment plant (Figure 5) where construction activity encountered dross (aluminum smelter ash). During a site inspection by Omaha District personnel, during plant construction, another dross pile was located near the treatment plant. A sample was collected from this dross pile and submitted for analysis.

1.4.3 Sample Preparation and Packaging. VOC samples were taken from the middle of the recovered split-spoon core and placed in two 4-oz glass jars. The jars were filled and sealed with teflon septum lids. Duplicates were taken by splitting the retrieved core lengthwise. One of the VOC samples were taken from one side and the duplicate from the other. Sampling for total organic carbon (TOC) was done by taking the retrieved core and compositing the material after the VOC samples were taken. Compositing was done by crushing and mixing the sample in a decontaminated stainless steel bowl with a stainless steel spatula or spoon, quartering the sample, and taking equal portions of each quarter to fill one eight-ounce wide mouth glass jar. The jars were filled 3/4 full and sealed with a Teflon-lined lid. Each jar was labeled for all analyses at the site. The handling of sediment samples was the same as for split-spoon samples for TOC; they were composited and placed in 8 oz wide-mouth jars. An additional sample was taken from each boring that was a composite of all subsamples from that boring. This material represented the soil (drill cuttings) that was placed in the drums.

1.4.4 <u>Labels, Chain of Custody, and Sample Shipment</u>.

1.4.4.1 <u>Labels</u>. All sample jars were labeled after the lid was sealed. The labels were prepared in advance by the MRD Laboratory using a new bar code format that facilitates logging in samples at the lab and minimizes time spent in the field labeling sample jars. The label contained (preprinted) the sample number, project code (PGA - Loral), station number (boring number PG90-1, etc.), required analyses and whether the sample is a grab or composite sample. The field sampler added the date and collection time, the depth of the sample, and the sampler's initials to the label with an indelible pen at the time of sampling. The sample number, collection time, and type of analyses were also marked on the boring log along side the indicated sampling interval.

The sample number consisted of alphanumeric characters denoting the site and type of sample, the boring and the depth, in that order. The site was denoted PGA for Phoenix Goodyear Airport. Sample types were denoted as "SB" for soil boring or "SS" for a sediment sample. The borings or sample locations were numbered PG90-1 thru 11; the last part of this number was incorporated into the sample number. The depth in feet was given as the nominal depth (i.e. a sample from a depth of 50 feet was denoted as 050 in the sample number). Thus a sample number PGA-SB-003-020 would indicate a soil boring sample from the Phoenix Goodyear Airport site, from a depth of 20 feet from boring PG90-3.

No preservatives were added to the samples, but all samples were placed on ice. The samples were shipped within 24 hours of sampling and every effort was made to ship the samples the same day.

1.4.4.2 <u>Chain-of-Custody Forms</u>. These forms are intended to track the samples through all persons who have had custody of the samples. A separate chain-of-custody form was prepared for samples from each borehole unless samples from a single boring were placed into two coolers (Appendix D). This form shows the project (site) name, station location (boring number), station number (depth), date and time of collection, name and signature of person(s) doing sampling, type of sample (composite or grab), number of containers, and required analyses. One line was used for each jar; except for the two 4-oz VOA jars. For example, one line was used for two 4 oz jars for volatile organic analyses, and another line for the one eight-ounce jar for TOC, even though the samples were from the same nominal depth. Separate lines were also used for duplicates. Under the remarks column, the sample number and container type were marked. In addition, the form was signed as relinquished and dated by the sampler in the lower portion of the form when the samples were delivered to the shipper . The original copy of the form was transported with the samples, and the copy kept for submission with the drilling logs. The samples were always kept under direct observation by the sampler or locked in a secure place prior to shipment.

1.4.4.3 Packaging and Shipment. All jars were wiped off prior to placement in the coolers. The jars were kept in a shaded, cool place until being placed in the coolers. The time between sample preparation and labeling and placement on ice was minimized and never exceeded 10 minutes. The labeled jars were enclosed in clear ziplock bags and placed upright on at least three inches of packing material in coolers provided by the MRD lab. No jar was allowed to touch another, and packing material was placed around them to prevent them from touching during transport. A block of frozen or cubed ice was placed among the samples along with the packing material. The samples were covered to the top of the cooler with more packing material. The signed chain-of custody forms were placed in a ziplock plastic bag and taped to the inside top of the cooler just before the samples were turned over to the shipper . The cooler's latch was secured and the cooler lid taped shut by strapping tape in at least two locations. Custody seals, signed and dated, were affixed across the lid seam and covered by nylon-reinforced strapping tape. All samples were shipped within 24 hours of obtaining samples by Federal Express Overnight Delivery to the Missouri River Division Laboratory in Omaha, Nebraska.

1.4.5 Decontamination.

1.4.5.1 Drilling Equipment. A wash rack was used for decontamination of all drilling equipment north of building 6 on the Loral facility. The rig and drilling pipe (both auger and drill rod) was steam cleaned using a high temperature, high pressure steam cleaner filled with clean water from a City of Goodyear fire hydrant. Care was taken to clean all work surfaces and the vehicle wheels. The drill rig and equipment was decontaminated prior to the start of work and before drilling at each borehole.

1.4.5.1 Sampling Equipment. All stainless steel split-spoons, (and shoes and subs) were decontaminated by an alconox wash followed by a tap water rinse, followed by a isopropanol rinse, followed by a deionized/distilled water rinse. Spilt-spoons were wrapped in aluminum foil following decontamination and remained wrapped until just prior to being lowered into the HSA for sampling. All other sampling equipment, bowls, spatulas, etc. were decontaminated by the wash and rinsing procedures.

1.4.6 Logs and Backfilling.

1.4.6.1 Logs. A complete and accurate field log (Appendix A) for each boring was prepared. Each log included the name of project, hole number, location of boring, type of drill rig, size and type of bit used, diameter of boring, location and number of each sample, blow counts, water level information (time-lapse between completion of drilling and measurement), and description of the materials. Soil materials were classified using the Unified Soil Classification System (soil description to follow ASTM D 2488-84). Description of materials included classification, consistency or density, plasticity, moisture content, color, etc. Descriptions were based on visual inspection of material in the field and on blow counts of the penetration tests. The HNu readings from field screening was recorded on the log. In addition, the time and date each sample was taken, along with the sample numbers, were also recorded on the log under the remarks column next to the sample depth. Additionally, a bound notebook was used to record any unusual circumstances or conditions which could affect the results of each sample, as well as a summary of all samples collected and relevant data for each sample (i.e., time of collection, analysis, sample number, field screen value, etc.).

1.4.6.2 Backfilling and Disposal of Cuttings. To comply with the State of Arizona drilling regulations, all borings not used for soil vapor ports, were backfilled their entire depth with cement grout. Borings that were cored through surface pavement were topped off with cement. Drill cuttings were stored in DOT approved drums and transported to a designated site at the airport until analytical results were available. From review of analytical results of the samples obtained from the borings, it was determined that all drums except those containing cuttings from boring PG90-4 could be disposed of. This was discussed with the EPA and airport officials. Agreement was reached to dispose of the drill cuttings at a designated location in the undeveloped portion of the airport. Thirteen drums of soil cuttings were disposed of in this manner on May 19, 1990 by Omaha District personnel. The three drums containing soils from boring PG90-4 were sampled for VOCs. Samples were shipped to the MRD Laboratory, who then submitted them to Environmental Health Research and Testing, Inc. for analysis. Results of the analyses on these samples were received on June 25, 1990 and indicated that the cuttings themselves did not have detectable levels of VOCs, presumably because of volatilization of TCE during drilling, handling, and drumming of the soil. A copy of these results are provided in Appendix H . Based on these results the remaining drums were disposed of on June 26, 1990 by Omaha District personnel. This disposal was also done in accordance with airport wishes. The EPA was also notified of the final disposal of drill cuttings.

1.4.7 Surveying. Boring locations were made with a tape from permanent buildings, wells, and other permanent features present at the site and shown on base maps on which coordinates are identified. In this way the horizontal coordinates of the borings can be determined. Only horizontal coordinates are necessary given the low relief and the fact that ground water elevations will not be needed.

1.4.8 Daily Reports. Daily reports (Appendix C) were completed by the Site Manager or Geologist after each day's work. These reports included information on personnel and equipment working at the site, work performed (including samples taken), weather conditions, safety levels (D, modified D, C, etc.) and equipment, quality control activities (such as HNu background readings, decontamination procedures), and problems encountered.

1.5 Field Investigation

1.5.1 Description of Work Performed

1.5.1.1 Soil Borings and Sediment Sampling. Work at the PGA site began on February 4, 1990 and ended on February 21, 1990. Sediment samples (Table 1) were collected from a shallow drainage way on the airport property on February 4 (see Figure 6). The next 2 1/2 days were used to purchase supplies, coordinate with the City of Goodyear for water, coordinate with Loral personnel concerning daily access within the plant, and replacement of an inoperable HNu probe.

All clearances were completed prior to start of drilling. This included coordination with the Arizona Department of Water Resources (ADWR), with regards to the necessary forms for drilling. A notice of intent to drill was filed prior to the start of drilling activities, and within 30 days after completion of field work Well Driller Reports and Notice of Abandonment forms were filed with the ADWR for their information. An access agreement was worked out between the Omaha District Office of Counsel and the appropriate Loral personnel. Maps of utilities were made available to the drill crew finalize the boring locations. Boring locations were staked by Corps of Engineers personnel prior to the arrival of the drill crew. They were located using a tape measure and pacing off the distances from a known point. The rationale for locating each boring is summarized in Table 2.

Work at the Loral facility began February 8, 1990 with the drilling of PG90-2. The total number of holes proposed for the project was eight (8) (see Figure 7), but before the start of drilling operations, one of the holes was deleted (PG90-1) because analytical data from an adjacent previous boring was supplied by Loral. During the investigation another boring (PG90-6) was omitted due to safety concerns (discrepancy between plans and actual utilities, unknown pavement thickness, low overhead clearance and overhead utilities).

Anticipated total depth of all borings was estimated at 60 feet based on depth to ground water at the site. All borings were advanced to 56.5 feet, as ground water was encountered between 50 and 55 feet at all locations drilled on site. The sampling interval was set at every five feet using a 3-inch O.D., stainless steel split spoon which was decontaminated after every sample, and steam cleaned after drilling and sampling of each boring was completed. Samples collected from each boring are summarized in Tables 3 to 8. Ground water samples were originally planned to be collected from selected borings on site. However, due to the coarse materials (gravel and cobbles) encountered at the water table it was felt the HydroPunch sampler would be damaged if sampling was attempted. Therefore no ground water samples were collected.

1.5.1.2 Soil Vapor Monitoring Ports. The construction and installation of the soil vapor monitoring ports in borings PG90-3, PG90-4, PG90-5, and PG90-8 all followed the same basic design (Figure 8). Two intervals were selected to be monitored based on site geology. The upper monitoring interval consisted of predominantly silts and clays, while the lower zone consisted of sands and gravels, with varying amounts of fines. Specific construction details for each installation are shown in Appendix B. All ports were constructed as clusters of two ports per location. Ports were constructed of 1-inch diameter flush threaded PVC riser pipe with a 5-foot long screen. The shallow port monitored a zone screened at 15-20 feet and the deep port monitored a zone screened at 40-45 feet (PG90-3,5, and 8), and 35-40 feet in PG90-4. The zones to be monitored were backfilled with pea gravel, and ranged in thickness from 20.8 to 22 feet for the upper zone, and 10.3 to 16.3 feet for the deeper zone.

The original bottom depth of all the borings was 56.5 feet. A cement plug was placed at the bottom of the boring and had a thickness of at least 5 feet and not more than 10 feet. A bentonite seal with a thickness of at least .4 feet was placed above the cement, with pea gravel above the bentonite, extending at least 1 foot above the screened interval of the lower zone to be monitored. A sand layer of at least .5 feet with a bentonite layer of the same thickness was insalled directly above the pea gravel. This process was repeated for the 15-20 foot interval that was also screened for monitoring. Above the upper monitoring zone, a cement seal was placed to within .6 feet of the ground surface. The ports were capped with a threaded PVC cap. For sampling purposes stopcocks adapted for the PVC riser were enclosed in a ziploc plastic bag and placed within the protective casing. Flush mounted, locking safety caps were used to seal off the ports so no stickups woulds obstruct Loral operations in the plant. The key for all ports was given to the Loral point of contact, Mr. Randy Clark.

Differences in the actual installation of the soil gas ports versus the original design described in the sampling plan addendum were made because of availability of materials in the field and refinements made during the field investigation. Additional layers of sand and bentonite were added above the gravel pack to prevent grout from entering the pack.

1.5.2 Site Specific Geology. The topography of the Loral plant is flat, and has no vegetation. Because it is an existing operational plant, asphalt or concrete covers the first .5-.7 feet of the ground surface. Material encountered in the borings remained basically consistent throughout the site. From ground surface to approximately 15 feet, a clayey silt was encountered. Clay was generally found to extend then appeared and remained from 15 feet to 30-35 feet. One exception was PG90-8, where the clay layer extended only from 10 to 15 feet, overlying sand from 15 to 30 feet. In all the borings, sand appeared at 35 feet (one boring had sandy clay). Sands, gravels, and sandy clays continue the remaining depths of the borings.

Ground water was encountered in all borings at the following depths :

1) PG90-2 --------- 54.5 feet
2) PG90-3 --------- 55.4 feet
3) PG90-4 --------- 53.6 feet
4) PG90-5 --------- 53.6 feet
5) PG90-7 --------- 52.9 feet
6) PG90-8 --------- 53.3 feet

High readings were registered on the Hnu instrument at PG90-4 which resulted in the need to vacate the borehole before sampling and drilling could continue.

At the completion of drilling activities, a walk over of the site was conducted with a Loral representative, R. Clark. At that time, Mr. Clark assured the field geologist, P. Brockman that Loral had no complaints about the condition of the boring sites.

1.5.3 Field Screening Results. An estimation of the degree of contamination was based on the readings obtained during the sampling process by the Hnu instrument. All field screen measurements were obtained as described in paragraph 1.4.2.1.3. Soil vapor monitoring ports were installed in the borings that registered the highest readings with the instrument. The following field contaminant levels were observed at the boring locations :

PG90-2, (located near the sewage plant at Loral) no readings above background were recorded with the HNu.

PG90-3, (located behind building 16, just inside the fence bordering the railroad tracks) readings were between 2.3 ppm - 3.2 ppm (parts per million), from 20 to 30 feet below ground surface.

PG90-4, (located southwest of building 1) recorded significantly higher hits with the HNu throughout the boring. Measurements ranged from 4.0ppm - 80.0ppm (head space). Also, readings from the top of the augers read from 200 ppm - 500 ppm from 40 to 56.5 feet.

PG90-5, (located at the northwest corner of building 1, adjacent to a TCA storage tank) provided some sporadic significant hits from 15 to 50 feet. Although much lower than PG90-4, they ranged from 5 ppm - 18 ppm.

PG90-7, (located east of building 6) readings ranged from 0.2 ppm - 8.8ppm. Although no port was installed in this boring, possible comtamination of soils from existing storm sewers exists in the area.

PG90-8, located west of building 26 and east of building 1, had hits ranging from 0.4ppm - 3.0 ppm. Although a soil vapor monitoring port was installed at this location, no significant contamination was apparent from the readings taken during the drilling/sampling process.

1.6 Soil Gas Sampling. Soil gas sampling was performed on existing soil vapor ports on the airport property and Loral facility and on the eight (8) newly installed ports installed during this investigation. Soil gas sampling and on site analytical services were performed by Hydro Geo Chem, Inc. located in Tucson, Arizona. Hydro Geo Chem was selected because of previous sampling they performed at the PGA site for the EPA. It was felt the resulting data would thus be more consistent with the previous data generated for the site.

Work was performed on April 16 and 17, 1990 and consisted of soil gas sample collection and on site analytical services. A total of twenty-two (22) soil gas sampling ports were sampled over this two day period. Problems were encountered with the laboratory standard and identification of compounds from installation PG90-5. This installation was later resampled during soil gas sampling for Goodyear at the PGA site. All data from this sampling effort is contained in the Final Soil Gas Report (Appendix I) .

Sampling procedures consisted of purging five well volumes from each soil gas port. Purging was done with a large vacuum pump attached to the port with a hose and appropriate fittings. Sampling was done using a vacuum pump and flow controller. A stainless steel cartridge was placed in the air stream on the inlet side of the flow controller. The stainless steel cartridge contained the carbon-filled glass tube used to sorb the volatiles from the soil vapor. A precise amount of air was drawn through the cartridge. The cartridge was then removed, capped, and labeled for analysis at the mobile lab. Details concerning analytical procedures are discussed in Appendix I.

2.0 ANALYTICAL RESULTS

2.1 Soil Boring and Sediment Sampling Program. All soil samples collected from the six(6) soil borings drilled at the Loral facility were analyzed for volatile organic compounds. Selected samples from each boring were also analyzed for total organic carbon. Sediment samples were collected from three (3) locations in a drainage ditch on the Phoenix Goodyear Airport property. These samples were all analyzed for selected metals. An additional sample was collected southwest of the ground water treatment plant, at a location previously identified as a dross pile. This sample was analyzed for PCBs and metals. Additional samples were also submitted from each boring to determine if the drill cuttings could be safely disposed of at the PGA site. These samples were analyzed for metals (Table 9) and volatile organic compounds (see Appendix H). The Missouri River Division Laboratory analyzed all field and QC samples for this project (Appendix J).

2.1.1 Analytical Methods. Soil/sediment samples were assayed using EPA SW-846, third edition, methodology unless otherwise stated. Soil samples submitted for volatile organic compounds were assayed using EPA Method 8240. This analysis also included a ten (10) peak library search for the tentative identification of the most prevalent compounds not on the Hazardous Substance List.

Total organic carbon (TOC) on soil was analyzed by using SW-846 Method 9060/415.1.

Sediment samples were analyzed for metals using EPA methods 7470 (Mercury), 7061 (Arsenic), 7741 (Selenium) and 6010 for all other metals. EP-Toxicity (method 1310), followed by analyses for metals were performed on the composite drum samples.

One sample was analyzed for PCBs using method 8080.

2.1.2 Quality Control/Quality Assurance Samples. A minimum of 10% of the samples collected were field splits sent by the Missouri River Division Laboratory to a contract lab for quality assurance (QA) assays. No trip blanks or rinsates were taken for soil samples as recommended by MRD. All labeling and chain-of-custody procedures were followed according to Corps of Engineers protocol. All samples were shipped within 24 hours of obtaining samples by Federal Express to the Missouri River Division (MRD) Laboratory.

Several minor chain-of-custody errors were noted with the samples upon receipt at MRD Laboratory. All samples were properly preserved (refrigerated), however, some ice had melted (1/4 inch of water in the bottom of some coolers) causing some bottle labels to become wet. No bottles were broken. A pencil was used to fill out one chain-of-custody.

VOA - Quality control (QC) samples were analyzed in-house at MRD Laboratory. Quality Assurance (QA) samples were sent to EHRT, Cincinnati, Ohio for analysis.

Metals - QC samples were analyzed in-house (MRD). QA samples (plus the QC sample labelled 'SW of Treatment Plant') were sent to EHRT for analysis. All EP-Toxicity metal samples were sent to EHRT for analysis.

TOC - QC samples were analyzed at EHRT. QA samples were sent to Tennessee Valley Authority (TVA), Chattanooga, TN for analysis.

PCBs - One QC sample was sent to EHRT for analysis.

2.1.3 Quality Control.

2.1.3.1 Volatile Organics: All surrogate spike recoveries were within acceptance ranges on all samples. These recoveries are reported on each of the data report sheets for each sample analyzed. Matrix spike/matrix spike duplicate analyses were performed with all recoveries and relative percent difference (RPD) results reported within acceptance criteria. Laboratory duplicate data agreed. Laboratory Control Sample (commonly known as EPA check samples) analyses showed all compounds correctly identified with results within acceptance windows. Laboratory/instrument/method blanks were free of contamination. The holding times for all samples were met. There were no problems with the samples during sample analysis.

2.1.3.2 Metals: One extraction blank for EP-Toxicity analysis contained trace levels of arsenic, and also was present in the field samples at about the same concentration. Recoveries for all method Quality Control (spikes, etc.) samples fell within published acceptance windows. No problems were noted during sample analysis.

2.1.3.3 Total Organic Carbon: Laboratory Quality Control results were not reported, except for field duplicate data which generally showed good agreement.

2.1.3.4 PCBs: The surrogate spike recovery for the one sample analyzed was within acceptance criteria.

2.1.4 Quality Assurance. No problems were reported in sample analysis by the various laboratories that served as Quality Assurance laboratory for this project.

2.1.5 Quality Assurance/Quality Control Data Comparisons.

2.1.5.1 Volatile Organics: Both the QC Lab (MRD) and the QA Lab (EHRT) used Method 8240 from SW-846. Within this method, two sample preparation procedures are listed. MRD used the medium level procedure (methanol extraction) resulting in detection limits being reported of about 500 ug/kg for most analytes. EHRT used the low level procedure (direct purge-and-trap of a soil/water mixture) resulting in detection limits being reported of about 3 ug/kg. Both procedures are acceptable and should not affect the quality of the data generated at both laboratories. One major data disagreement was seen in sample 'PGA-SB-004-25' (Table F4) where MRD reported TCE at 5100 ug/kg, whereas EHRT did not report finding any at a detection limit of 3.2 ug/kg. Both laboratories analyzed their second sample bottle with the same results being observed for this duplicate. It appears that both laboratories analyzed the sample correctly. During drilling and sampling at boring PG90-4, the sample collected at a depth of 25 feet (PGA-SB-004-25) exhibited an HNu headspace reading of 70 ppm, the second highest headspace reading detected from all the samples collected during the investigation. The highest reading was from a depth of 30 feet in this same boring. Soil gas readings from boring PG90-4, from the shallow port also resulted in the highest TCE levels detected during the soil gas investigation. The high TCE levels recorded by the MRD lab for sample PGA-SB-004-25 is supported by these other readings. One possible explanation could be sample/bottle mix-up in the field. All other VOA data agreed.

2.1.5.2 <u>Metals</u>: Data Agreed. There were no QA samples taken for the EP-Toxicity metals analysis.

2.1.5.3 <u>Total Organic Carbon</u>: Data disagreements were observed in most samples, however, the impact of these disagreements (severity) for this project is not known.

2.1.5.4 <u>PCBs</u>: No QA split taken for the one QC sample analyzed.

2.1.6 <u>Data Summary</u>. Trichoroethene (TCE) was encountered in soil samples in two of the six borings drilled during this investigation (see Tables 10 to 15). The highest levels were encountered in boring PG90-4, where TCE was detected at levels of 5100 to 8700 mg/kg at a depth of 25 feet. Soils at depths of 15 and 20 feet had TCE present at levels of 500 and 63 to 110 mg/kg respectively. At a depth of 55 feet, soils at the top of the water table had TCE at levels of 110 to 600 mg/kg. The other boring that encountered TCE was PG90-5. TCE was detected at a depth of 55 feet from soils collected at the top of the water table, at levels of 74 to 110 mg/kg. The presence of TCE in the soils at the 55 foot depths suggests contamination of soils from contaminated ground water. The presence of contaminants at shallower depths suggests contamination from near surface sources.

Total Organic Carbon (TOC) samples were collected to furnish additional information that could be used to help quantify VOC mass in the subsurface. TOC levels ranged from below detection limits (<250 mg/kg) to 26,121 mg/kg. The highest levels were encountered in soils collected at depths of 10 and 20 feet. TOC levels from soils collected at depths of 30 feet ranged from below detection limits to 308 mg/kg.

Sediment samples collected from the drainage ditch on PGA property were tested for metals. These results are shown on Table 16.

One soil sample was collected from a dross pile located near the ground water treatment plant (see Table 17), and was analyzed for metals and PCBs. PCBs were detected at 266 ug/kg, as well as high levels of metals; aluminum 19,000 mg/kg, cadmium 77.9 mg/kg, chromium 758 mg/kg, copper 18,100 mg/kg, iron 21,800 mg/kg, lead 1370 mg/kg, manganese 1480 mg/kg, nickel mg/kg, zinc 3630 mg/kg. These high levels are characteristic of smelter ash associated with smelting of scrap aluminium and plane parts.

2.2 Soil Gas Sampling. Soil gas sampling was performed on the existing soil vapor ports at the Airport property and Loral Facility and on eight (8) newly installed ports. Work was performed on April 16 and 17, 1990, and consisted of soil gas collection and analyses on site with a mobile laboratory. PG90-5 was resampled on July 9, 1990, due to problems initially encountered with the laboratory standard and the identification of two chlorinated hydrocarbons, carbon tetrachloride and 1,1,1 trichloroethane (TCA).

This investigation was conducted by Hydro Geo Chem, Inc. under contract to the U.S. Army Corps of Engineers.

2.2.1 Introduction. All soil gas sampling was done at nine (9) locations on the site. All sampling was done at existing soil gas monitoring installations with the following chlorinated volatile hydrocarbons being analyzed:

tetrachloroethene (PCE)
trichloroethene (TCE)
1,1-dichloroethene (1,1-DCE)
1,1,1-trichloroethane (1,1,1-TCA)
carbon tetrachloride (CCl_4)
chloroform ($CHCl_3$)

2.2.2 Analytical Methods and Instrumentation. Samples were collected using a computerized mass-flow controller to regulate flow and volume measurement. The volatile chlorinated organics were collected in a glass cartridge contained in a stainless steel housing. The glass cartridges were packed with three activated carbons - carbotrap, carbopak, and carbosieve S-111. These carbons were selected to collect organics with widely different volatiles. The cartridges were assayed on site in a mobile laboratory equipped with an Envirochem 850 Thermal Tube Desorber, a Varian 3400 Gas Chromatograph, a Tracor 700A Hall

Detector, a Tracor 703 PID Detector, a J.W. Scientific DB 624 30m Megabore column, a Spectra Physics 4400 Chrom Jet Integrator and a Varian 3400 Integrator. Gas chromatography was used to identify and measure concentrations of the selected compounds. The soil gas cartridges were desorbed at a temperature of 380 ^{o}C using a thermal desorption unit. Samples were injected by the desorber into a gas chromatograph equipped with a capillary column and a photoionization (PID) and Hall conductivity detector.

2.2.3 Quality Assurance/Quality Control. Standards were prepared from stock solutions of neat reagent grade compounds. For working standards or daily standards, a measured volume of the standard solution was injected through a septum into a nitrogen filled one-liter glass gas bottle. A measured volume of the resulting gas mixture was injected into a 200-ml/min helium stream into a carbon-packed cartridge. After two minutes, the cartridge was transferred to a thermal desorber and analyzed as a regular soil-gas sample.

Prior to sampling each day, field blanks of the sampling apparatus were taken to check for background contamination of the sampling system and cartridge. Reproducibility was demonstrated by doing serial duplicates from 10% of the sample locations. Detection limits were 0.01 ug/l (micrograms per liter) or less soil gas with the analyses being reported to two significant figures. The minimum amount being reported was 0.01 ug/l.

2.2.4 Analytical Results. Table 18 is a summary of analytical results from the April 16-17, 1990, sampling efforts, and resampling of PG90-5 on July 9, 1990. Table 19 is a summary of the QA samples sent to another laboratory for verification of analytical results. The QC/QA sample analysis for PG90-4-20 and SVEA1-37 compare favorable.

The U.S. Army Corps of Engineers installed soil vapor monitoring ports in borings PG90-3, PG90-4, PG90-5, and PG90-8. There were two soil monitoring ports per bore hole; one at 20 feet and the other at 40-45 feet. The other soil gas analyses reported in Table 18 were resamples of formerly installed EPA soil monitoring ports.

Soil boring PG90-3 located on the west side of Building 36 had detectable amounts of TCE, 1,1,1-TCA, and 1,1-DCE.

Soil boring PG90-4, located southwest of Building 16, had high levels of TCE at the 20 foot depth (3350 ug/l and 3460 ug/l), moderate levels of PCE (268 ug/l and 307 ug/l), and lower levels of 1,1-DCE (68 ug/l and 991 ug/l). At the 40 foot depth, TCE was reported at 683 ug/l, PCE was found at 103 ug/l, and 1,1-DCE was found at 88 ug/l. Chloroform and carbon tetrachloride had minor hits of 2.8 and 2.1 ug/l respectively.

Soil boring PG90-5, located on the west side of Building 1, had high hits of 1,1,1-TCA and 1,1-DCE. Moderate to non-detectable levels were reported for TCE and PCE.

Soil boring PG90-8, located on the west side of Building 26, had moderate hits of TCE and 1,1-DCE at the 20 foot and 40 foot depth levels. Small amounts of chloroform and PCE were reported for the 20 foot and 40 foot depths.

TABLES

TABLE 1

SAMPLE SUMMARY FOR SEDIMENT SAMPLING

Sample Depth	Sample Date	Sample Time (1)	Sample No.	Analysis
0.0 - 0.3	2/ 4/90	1525	PGA-SB-009	METALS
0.0 - 0.3	2/ 4/90	1455	PGA-SB-010	METALS
0.0 - 0.3	2/ 4/90	1425	PGA-SB-011	METALS
0.1 - 0.5	2/ 4/90	1512	DROSS SAMPLE	METALS PCB

(1) Hours

TABLE 2

Boring #	Location	Rationale
PG90-2	Adjacent to Sewage TP	This is to identify contamination associated with possible past disposal of volatiles/metals to a sewage sludge bed.
PG90-3	West of bldg 16	This is to investigate potential volatile organics and metals contamination resulting from the operation of a TCE degreaser and plating shop in the northern part of building 16.
PG90-4	SW corner of bldg 1	This boring is intended to investigate contamination from leaking storm sewers from beneath building 1.
PG90-5	NW corner of bldg 1	This is intended to identify any contamination at depth resulting from the operation of a possible former TCE storage tank at that location.
PG90-7	E side of bldg 6	This boring is intended to investigate contamination from leaking storm sewers and floor drains from beneath building 6.
PG90-8	W side of bldg 26	This is intended to investigate the contamination at depth possibly resulting from the operation of a former vapor degreaser located in this building. Odors have been reported by employees working in offices located at the former site of the degreaser.

TABLE 3

SAMPLE SUMMARY FOR SOIL BORING PG90-2

Sample Depth	Sample Date	Sample Time (1)	Sample No.	Analysis	Field (2) Screen (ppm)
5.0 - 7.0	2/ 8/90	1055	PGA-SB-002-05	VOA (3)	< 1
10.0 - 12.0	2/ 8/90	1315	PGA-SB-002-10	VOA	< 1
15.0 - 17.0	2/ 8/90	1340	PGA-SB-002-15	VOA	< 1
20.0 - 21.5	2/ 8/90	1400	PGA-SB-002-20	VOA,TOC (4)	1.6
25.0 - 26.5	2/ 8/90	1415	PGA-SB-002-25	VOA	< 1
30.0 - 31.5	2/ 8/90	1445	PGA-SB-002-30	VOA	1
35.0 - 36.5	2/ 8/90	1500	PGA-SB-002-35	VOA	1
40.0 - 41.5	2/ 8/90	1525	PGA-SB-002-40	VOA	< 1
45.0 - 46.5	2/ 8/90	1600	PGA-SB-002-45	VOA,TOC	2.6
50.0 - 51.5	2/ 8/90	1645	PGA-SB-002-50	VOA	1.2
55.0 - 56.5	2/ 8/90	1725	PGA-SB-002-55	VOA	0.7

(1) Hours
(2) Headspace analysis with HNu instrument
(3) Volatile Organic Analysis
(4) Total Organic Carbon

TABLE 4

SAMPLE SUMMARY FOR SOIL BORING PG90-3

Sample Depth	Sample Date	Sample Time (1)	Sample No.	Analysis	Field Screen (ppm) [2]
5.0 - 6.5	2/ 9/90	1510	PGA-SB-003-05	VOA [3]	0
10.0 - 11.5	2/ 9/90	1520	PGA-SB-003-10	VOA,TOC [4]	1.6
15.0 - 16.5	2/ 9/90	1530	PGA-SB-003-15	VOA	0.4
20.0 - 21.5	2/ 9/90	1545	PGA-SB-003-20	VOA	2.3
25.0 - 26.5	2/ 9/90	1555	PGA-SB-003-25	VOA	2.5
30.0 - 31.5	2/ 9/90	1625	PGA-SB-003-30	VOA,TOC	3.2
35.0 - 36.5	2/ 9/90	1640	PGA-SB-003-35	VOA	1.2
40.0 - 41.5	2/ 9/90	1655	PGA-SB-003-40	VOA	1.2
45.0 - 46.5	2/ 9/90	1715	PGA-SB-003-45	VOA	0.6
50.0 - 51.5	2/ 9/90	1730	PGA-SB-003-50	VOA	1.1
55.0 - 56.5	2/ 9/90	1755	PGA-SB-003-55	VOA	1.2

(1) Hours
(2) Headspace analysis by HNu instrument
(3) Volatile Organic Analysis
(4) Total Organic Carbon

TABLE 5

SAMPLE SUMMARY FOR SOIL BORING PG90-4

Sample Depth	Sample Date	Sample Time (1)	Sample No.	Analysis	Field (2) Screen (ppm)
5.0 - 6.5	2/13/90	1032	PGA-SB-004-05	VOA (3)	13
10.0 - 11.5	2/13/90	1050	PGA-SB-004-10	VOA,TOC(4)	30
15.0 - 16.5	2/13/90	1100	PGA-SB-004-15	VOA	45
20.0 - 21.5	2/13/90	1114	PGA-SB-004-20	VOA	55
25.0 - 26.5	2/13/90	1131	PGA-SB-004-25	VOA	70
30.0 - 31.5	2/13/90	1258	PGA-SB-004-30	VOA,TOC	80
35.0 - 36.5	2/13/90	1310	PGA-SB-004-35	VOA	4
40.0 - 41.5	2/13/90	1352	PGA-SB-004-40	VOA	20
45.0 - 46.5	2/13/90	1420	PGA-SB-004-45	VOA	4
50.0 - 51.5	2/13/90	1450	PGA-SB-004-50	VOA	11
55.0 - 56.5	2/13/90	1512	PGA-SB-002-55	VOA	30

(1) Hours
(2) Headspace analysis by HNu instrument
(3) Volatile Organic Analysis
(4) Total Organic Carbon

TABLE 6

SAMPLE SUMMARY FOR SOIL BORING PG90-5

Sample Depth	Sample Date	Sample Time (1)	Sample No.	Analysis	Field (2) Screen (ppm)
5.0 - 6.5	2/15/90	0915	PGA-SB-005-05	VOA (3)	1.2
10.0 - 11.5	2/15/90	0923	PGA-SB-005-10	VOA,TOC(4)	0.4
15.0 - 16.5	2/15/90	0930	PGA-SB-005-15	VOA	12
20.0 - 21.5	2/15/90	0945	PGA-SB-005-20	VOA	5
25.0 - 26.5	2/15/90	0957	PGA-SB-005-25	VOA	18
30.0 - 31.5	2/15/90	1015	PGA-SB-005-30	VOA,TOC	7
35.0 - 36.5	2/15/90	1052	PGA-SB-005-35	VOA	2
40.0 - 41.5	2/15/90	1103	PGA-SB-005-40	VOA	2.5
45.0 - 46.5	2/15/90	1118	PGA-SB-005-45	VOA	5
50.0 - 50.8	2/15/90	1135	PGA-SB-005-50	VOA	7
55.0 - 56.5	2/15/90	1152	PGA-SB-005-55	VOA	1.4

(1) Hours
(2) Headspace analysis by HNu instrument
(3) Volatile Organic Analysis
(4) Total Organic Carbon

TABLE 7

SAMPLE SUMMARY FOR SOIL BORING PG90-7

Sample Depth	Sample Date	Sample Time (1)	Sample No.	Analysis	Field (2) Screen (ppm)
5.0 - 6.5	2/19/90	1405	PGA-SB-007-05	VOA (3)	0.2
10.0 - 11.5	2/19/90	1412	PGA-SB-007-10	VOA,TOC(4)	0.8
15.0 - 16.5	2/19/90	1418	PGA-SB-007-15	VOA	0.6
20.0 - 21.5	2/19/90	1428	PGA-SB-007-20	VOA	5.0
25.0 - 26.5	2/19/90	1440	PGA-SB-007-25	VOA	5.0
30.0 - 31.5	2/19/90	1450	PGA-SB-007-30	VOA,TOC	0.6
35.0 - 36.5	2/19/90	1510	PGA-SB-007-35	VOA	3.1
40.0 - 41.5	2/19/90	1515	PGA-SB-007-40	VOA	8.8
45.0 - 46.5	2/19/90	1535	PGA-SB-007-45	VOA	7.2
50.0 - 51.5	2/20/90	0910	PGA-SB-007-50	VOA	0.4
55.0 - 56.5	2/20/90	0930	PGA-SB-007-55	VOA	-

(1) Hours
(2) Headspace analysis by HNu instrument
(3) Volatile Organic Analysis
(4) Total Organic Carbon

TABLE 8

SAMPLE SUMMARY FOR SOIL BORING PG90-8

Sample Depth	Sample Date	Sample Time (1)	Sample No.	Analysis	Field Screen (ppm) (2)
5.0 - 6.5	2/16/90	1006	PGA-SB-008-05	VOA (3)	0.8
10.0 - 11.5	2/16/90	1012	PGA-SB-008-10	VOA,TOC (4)	1.2
15.0 - 16.5	2/16/90	1020	PGA-SB-008-15	VOA	1.0
20.0 - 21.5	2/16/90	1032	PGA-SB-008-20	VOA	1.8
25.0 - 26.5	2/16/90	1040	PGA-SB-008-25	VOA	1.2
30.0 - 31.5	2/16/90	1145	PGA-SB-008-30	VOA,TOC	3.0
35.0 - 36.5	2/16/90	1155	PGA-SB-008-35	VOA	0.4
40.0 - 41.5	2/16/90	1205	PGA-SB-008-40	VOA	2.0
45.0 - 46.5	2/16/90	1220	PGA-SB-008-45	VOA	1.0
50.0 - 51.5	2/16/90	1230	PGA-SB-008-50	VOA	1.0
55.0 - 56.5	2/16/90	1253	PGA-SB-008-55	VOA	1.0

(1) Hours
(2) Headspace analysis by HNu instrument
(3) Volatile Organic Analysis
(4) Total Organic Carbon

TABLE 9

ANALYTICAL RESULTS FOR DRUM SAMPLES

METAL/ID(1)	PGA-SB-002-DRUM	PGA-SB-003-DRUM
Arsenic	5.4(2)	5.5(2)
Barium	153	58.3
Cadmium	<3.6	<3.6
Chromium	<4.7	<4.7
Lead	<12.7	<12.7
Mercury	<0.1	<0.1
Selenium	<1.8	<1.8
Silver	<4.7	<4.7

METAL/ID	PGA-SB-004-DRUM	PGA-SB-005-DRUM
Arsenic	4.7(2)	4.9(2)
Barium	270	291
Cadmium	<3.6	<3.6
Chromium	<4.7	<4.7
Lead	<12.7	<12.7
Mercury	<0.1	<0.1
Selenium	<1.8	<1.8
Silver	<4.7	<4.7

METAL/ID	PGA-SB-007-DRUM	PGA-SB-008-DRUM
Arsenic	4.4(2)	3.9(2)
Barium	<1.7	209
Cadmium	<3.6	<3.6
Chromium	<4.7	<4.7
Lead	<12.7	<12.7
Mercury	<0.1	<0.1
Selenium	<1.8	<1.8
Silver	<4.7	<4.7

(1) EP-Toxicity Metals Results; units = ug/kg
(2) also found in blank

TABLE 10

ANALYTICAL RESULTS FOR SOIL BORING PG90-2

Sample No.	Sample Date	Date Analyzed	Analysis VOA[1]	Analysis TOC[2]
PGA-SB-002-05	2/ 8/90	2/ 9/90	BDL	NA[3]
PGA-SB-002-10	2/ 8/90	2/ 9/90	BDL	NA
PGA-SB-002-15	2/ 8/90	2/ 9/90	BDL	NA
PGA-SB-002-20	2/ 8/90	2/ 9/90	BDL	21970
PGA-SB-002-25	2/ 8/90	2/ 9/90	BDL	NA
PGA-SB-002-30	2/ 8/90	2/ 9/90	BDL	NA
PGA-SB-002-35	2/ 8/90	2/ 9/90	BDL	NA
PGA-SB-002-40	2/ 8/90	2/ 9/90	BDL	NA
PGA-SB-002-45	2/ 8/90	2/13/90	BDL	<250
-45-QC	2/ 8/90	-	NA	<250
PGA-SB-002-50	2/ 8/90	2/10/90	BDL	NA
PGA-SB-002-55	2/ 8/90	2/12/90	BDL	NA
-55-QA	2/ 8/90	2/26/90	(4)	NA

(1) Trichloroethene in mg/kg (dry weight).
(2) Total Organic Carbon in mg/kg (dry weight).
(3) Not Analyzed
(4) QA laboratory reported 47 ug/kg benzene, 22 ug/kg toluene, 92 ug/kg ethylbenzene, 27 ug/kg 1,2-dichloroethene.

TABLE 11

ANALYTICAL RESULTS FOR SOIL BORING PG90-3

Sample No.	Sample Date	Date Analyzed	Analysis VOA[1]	Analysis TOC[2]
PGA-SB-003-05	2/ 9/90	2/12/90	BDL	NA[3]
PGA-SB-003-10	2/ 9/90	2/12/90	BDL	9575
PGA-SB-003-15	2/ 9/90	2/12/90	BDL	NA
PGA-SB-003-20	2/ 9/90	2/12/90	BDL	NA
-20-QC	2/ 9/90	2/12/90	BDL	
PGA-SB-003-25	2/ 9/90	2/12/90	BDL	NA
-25-QA	2/ 9/90	2/16/90	(4)	
PGA-SB-003-30	2/ 9/90	2/12/90	BDL	<250
-30-QC	2/ 9/90	-		257
PGA-SB-003-35	2/ 9/90	2/12/90	BDL	NA
PGA-SB-003-40	2/ 9/90	2/12/90	BDL	NA
PGA-SB-003-45	2/ 9/90	2/13/90	BDL	NA
PGA-SB-003-50	2/ 9/90	2/13/90	BDL	NA
PGA-SB-003-55	2/ 9/90	2/13/90	BDL	NA

(1) Trichloroethene in mg/kg (dry weight).
(2) Total Organic Carbon in mg/kg (dry weight).
(3) Not Analyzed
(4) QA laboratory reported 38 ug/kg toluene.

TABLE 12

ANALYTICAL RESULTS FOR SOIL BORING PG90-4

Sample No.	Sample Date	Date Analyzed	Analysis VOA(1)	TOC(2)
PGA-SB-004-05	2/13/90	2/14/90	BDL	NA(3)
PGA-SB-004-10	2/13/90	2/14/90	BDL	15784
PGA-SB-004-15	2/13/90	2/14/90	500	NA
PGA-SB-004-20	2/13/90	2/14/90	63	NA
-20-QC	2/13/90	2/14/90	110	NA
PGA-SB-004-25	2/13/90	2/14/90	5100	NA
-25 (4)	2/13/90	2/15/90	8700	NA
-25-QA	2/13/90	2/23/90	(5)	
PGA-SB-004-30	2/13/90	2/14/90	BDL	308
-30-QC	2/13/90	-	NA	<250
PGA-SB-004-35	2/13/90	2/14/90	BDL	NA
PGA-SB-004-40	2/13/90	2/15/90	BDL	NA
PGA-SB-004-45	2/13/90	2/15/90	BDL	NA
PGA-SB-004-50	2/13/90	2/15/90	BDL	NA
PGA-SB-004-55	2/13/90	2/15/90	600	NA
-55 (3)	2/13/90	2/21/90	110	NA

(1) Trichloroethene in mg/kg (dry weight).
(2) Total Organic Carbon in mg/kg (dry weight).
(3) Not Analyzed
(4) Lab duplicate.
(5) QA lab reported below detection limits for all volatile organics in this sample.

TABLE 13

ANALYTICAL RESULTS FOR SOIL BORING PG90-5

Sample No.	Sample Date	Date Analyzed	Analysis VOA(1)	TOC(2)
PGA-SB-005-05	2/15/90	2/16/90	BDL	NA(3)
PGA-SB-005-10	2/15/90	2/16/90	BDL	640
PGA-SB-005-15	2/15/90	2/16/90	BDL	NA
PGA-SB-005-20	2/15/90	2/16/90	BDL	NA
-20-QC	2/15/90	2/16/90	BDL	NA
PGA-SB-005-25	2/15/90	2/16/90	BDL	NA
-25-QA	2/15/90	3/ 1/90	BDL	NA
PGA-SB-005-30	2/15/90	2/16/90	BDL	<250
-30-QC	2/15/90	-	NA	<250
PGA-SB-005-35	2/15/90	2/16/90	BDL	NA
PGA-SB-005-40	2/15/90	2/16/90	BDL	NA
PGA-SB-005-45	2/15/90	2/19/90	BDL	NA
PGA-SB-005-50	2/15/90	2/16/90	BDL	NA
PGA-SB-005-55	2/15/90	2/16/90	110	NA
-55 (4)	2/15/90	2/23/90	74	NA

(1) Trichloroethene in mg/kg (dry weight).
(2) Total Organic Carbon in mg/kg (dry weight).
(3) Not Analyzed
(4) Lab duplicate.

TABLE 14

ANALYTICAL RESULTS FOR SOIL BORING PG90-7

Sample No.	Sample Date	Date Analyzed	Analysis VOA(1)	TOC(2)
PGA-SB-007-05	2/19/90	2/21/90	BDL	NA
PGA-SB-007-10	2/19/90	2/21/90	BDL	5237
PGA-SB-007-15	2/19/90	2/21/90	BDL	NA
PGA-SB-007-20	2/19/90	2/21/90	BDL	NA
-20-QC	2/19/90	2/22/90	BDL	NA
PGA-SB-007-25	2/19/90	2/22/90	BDL	NA
-25-QA	2/19/90	2/23/90	BDL	NA
PGA-SB-007-30	2/19/90	2/22/90	BDL	278
30-QC	2/19/90	-	NA	<250
PGA-SB-007-35	2/19/90	2/22/90	BDL	NA
PGA-SB-007-40	2/19/90	2/22/90	BDL	NA
PGA-SB-007-45	2/19/90	2/22/90	BDL	NA
PGA-SB-007-50	2/20/90	2/22/90	BDL	NA
PGA-SB-007-55	2/20/90	2/22/90	BDL	NA

(1) Trichloroethene in mg/kg (dry weight).
(2) Total Organic Carbon in mg/kg (dry weight).
(3) Not Analyzed

TABLE 15

ANALYTICAL RESULTS FOR SOIL BORING PG90-8

Sample No.	Sample Date	Date Analyzed	Analysis VOA(1)	TOC(2)
PGA-SB-008-05	2/16/90	2/19/90	BDL	NA(3)
PGA-SB-008-10	2/16/90	2/19/90	BDL	26121
PGA-SB-008-15	2/16/90	2/19/90	BDL	NA
PGA-SB-008-20	2/16/90	2/19/90	BDL	NA
-20-QC	2/16/90	2/19/90	BDL	NA
PGA-SB-008-25	2/16/90	2/19/90	BDL	NA
-25-QA	2/16/90	3/ 1/90	BDL	NA
PGA-SB-008-30	2/16/90	2/19/90	BDL	<250
30-QC	2/16/90	-	NA	272
PGA-SB-008-35	2/16/90	2/19/90	BDL	NA
PGA-SB-008-40	2/16/90	2/21/90	BDL	NA
PGA-SB-008-45	2/16/90	2/21/90	BDL	NA
PGA-SB-008-50	2/16/90	2/21/90	BDL	NA
PGA-SB-008-55	2/16/90	2/21/90	BDL	NA

(1) Trichloroethene in mg/kg (dry weight).
(2) Total Organic Carbon in mg/kg (dry weight).
(3) Not Analyzed

TABLE 16

ANALYTICAL RESULTS FOR SEDIMENT SAMPLES(1)

Metal/ID	PGA-SS-009	PGA-SS-010	PGA-SS-010-QC	PGA-SS-011
Antimony	<50	<50	<50	<50
Arsenic	3.1	3.3	3.8	3.3
Beryllium	<2	<2	<2	3
Cadmium	<3	<3	<3	<3
Chromium	17	44	43	29
Copper	13	51	44	20
Lead	<10	21	15	11
Mercury	<0.05	<0.05	0.06	<0.05
Nickel	10	14	14	14
Silver	<10	<10	<10	<10
Selenium	<0.2	<0.2	<0.2	<0.2
Thallium	<100	<100	<100	<100
Zinc	32	53	54	50

(1) units = mg/kg (dry weight)

TABLE 17

ANALYTICAL RESULTS OF DROSS SAMPLE SOUTHWEST OF TREATMENT PLANT

METAL(1)		PCB(2)	
Aluminum	19000	Aroclor-1016	<28
Antimony	<1.6	Aroclor-1221	<28
Arsenic	<0.34	Aroclor-1232	<28
Beryllium	0.73	Aroclor-1242	<28
Cadmium	77.9	Aroclor-1248	<28
Chromium	758	Aroclor-1254	266
Copper	18100	Aroclor-1260	<28
Iron	21800		
Lead	1370		
Manganese	1480		
Mercury	0.1		
Nickel	238		
Selenium	1.5		
Silver	11.1		
Thallium	<146		
Zinc	3630		

(1) units = mg/kg (dry weight)
(2) units = ug/kg

TABLE 18
SUMMARY OF ANALYTICAL RESULTS
APRIL 17, 1990
LORAL FACILITY
GOODYEAR, ARIZONA
(UNITS OF CONCENTRATION, uG/L gas)

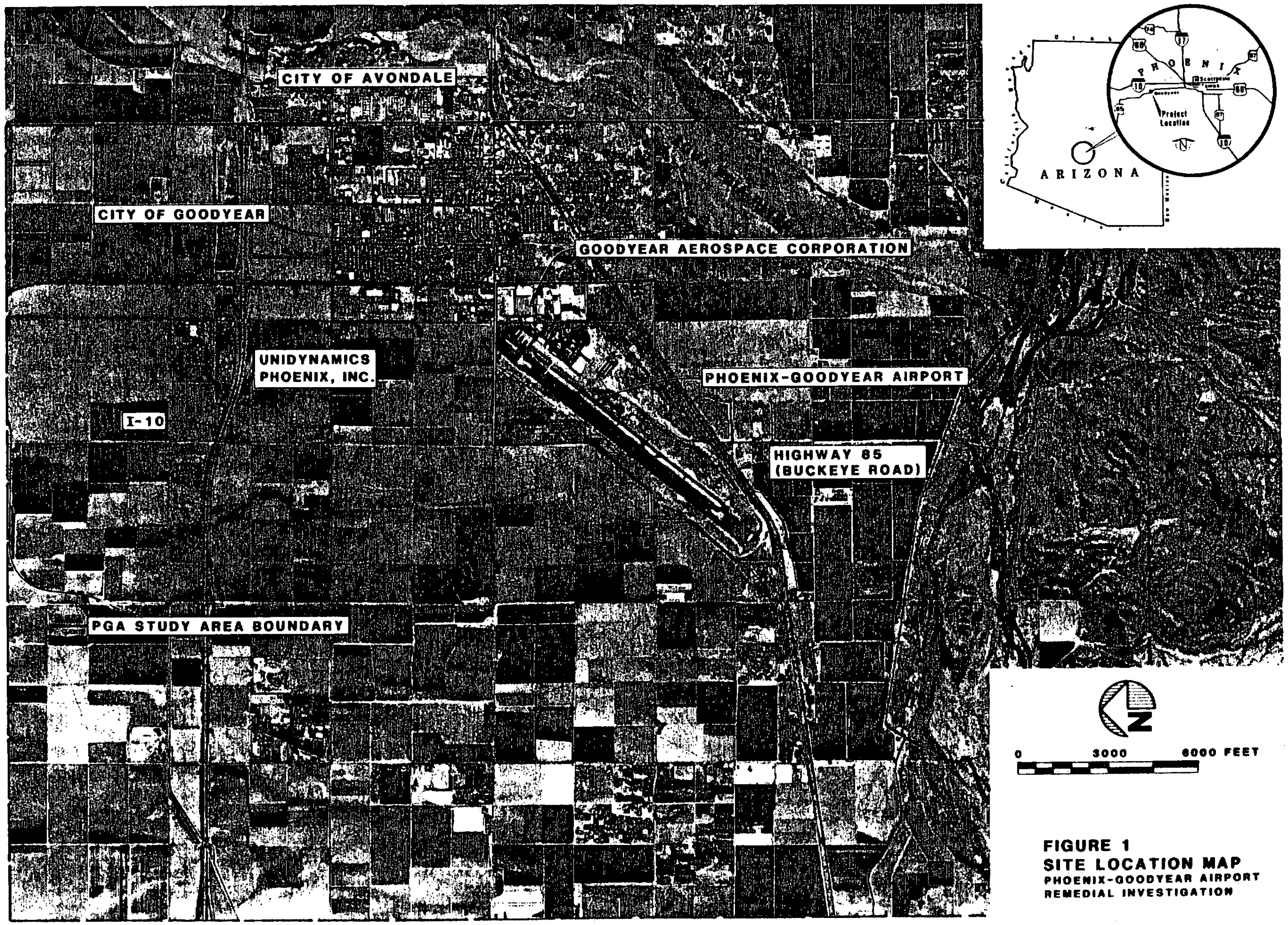
SAMPLE	DEPTH	1,1-DCE	CHLORO FORM	1,1,1-TCA	CARBON TET	TCE	PCE
SG-TRIP*	0	ND	ND	ND	ND	ND	ND
FB17APR	0	ND	ND	ND	ND	ND	ND
0910 -A	60.00	ND	15.00	ND	ND	516.00	10.90
0910 -B	60.00	ND	16.00	ND	ND	518.00	6.50
PG903	45.00	29.20	ND	25.10	ND	125.00	0.98
PG903	20.00	14.40	ND	208.00	ND	55.00	0.67
PG904-A	20.00	67.60	0.70	ND	38.20	3350.00	268.00
PG904-B	20.00	99.00	1.00	ND	64.00	3460.00	307.00
PG904	40.00	87.60	2.76	ND	2.14	653.00	103.00
PG905	45.00	2400.00	ND	2070.00	ND	453.00	14.10
PG905-A*	45.00	1590.00	ND	2510.00	ND	31.1	ND
PG905-B*	45.00	2280.00	ND	2050.00	ND	35.4	ND
PG905	20.00	1910.00	ND	ND	1720.00**	63.00	1.00
PG905-A*	20.00	3280.00	ND	1880.00	ND	666.00	6.29
PG905-B*	20.00	3910.00	ND	1900.00	ND	740.00	6.58
PG908	20.00	464.00	10.20	ND	ND	445.00	3.33
PG908	45.00	552.00	17.90	ND	ND	389.00	1.55
SVEA1	7.00	5.59	0.87	ND	ND	168.00	4.85
SVEA1	17.00	0.24	ND	ND	ND	5.93	ND
SVEA1	27.00	0.19	ND	ND	ND	4.53	ND
SVEA1-A	37.00	33.90	3.71	0.86	ND	1230.00	27.30
SVEA1-B	37.00	58.40	4.37	ND	ND	1080.00	22.80
SVEA2	7.00	5.55	0.95	32.90	ND	103.00	1.18
SVEA2	17.00	14.10	ND	63.70	ND	7.42	ND
SVEA2	27.00	0.37	2.44	ND	ND	4.15	ND
SVEA2	37.00	48.80	4.11	ND	0.56	755.00	27.40
SVEA3	7.00	4.97	ND	ND	ND	216.00	13.30
SVEA3	17.00	11.80	3.47	ND	ND	72.30	0.55
SVEA3	27.00	ND	ND	ND	ND	17.60	0.23
SVEA3	37.00	73.50	1.82	6.63	0.69	306.00	26.10
W0903	62.00	98.80	6.83	ND	ND	442.00	10.00

* = RESAMPLED JULY 9, 1990
** = MISIDENTIFIED AS INDICATED BY RESAMPLING
A,B = SERIAL DUPLICATES
ND = NOT DETECTED ABOVE DETECTION LIMIT OF 0.01 uG/L (GAS)

TABLE 19
SUMMARY OF OUTSIDE LAB VERIFICATION
ANALYTICAL RESULTS
EPA 601 - PURGEABLE HALOCARBONS
LORAL FACILITY, GOODYEAR, ARIZONA
(UNITS OF CONCENTRATION, uG/L GAS)

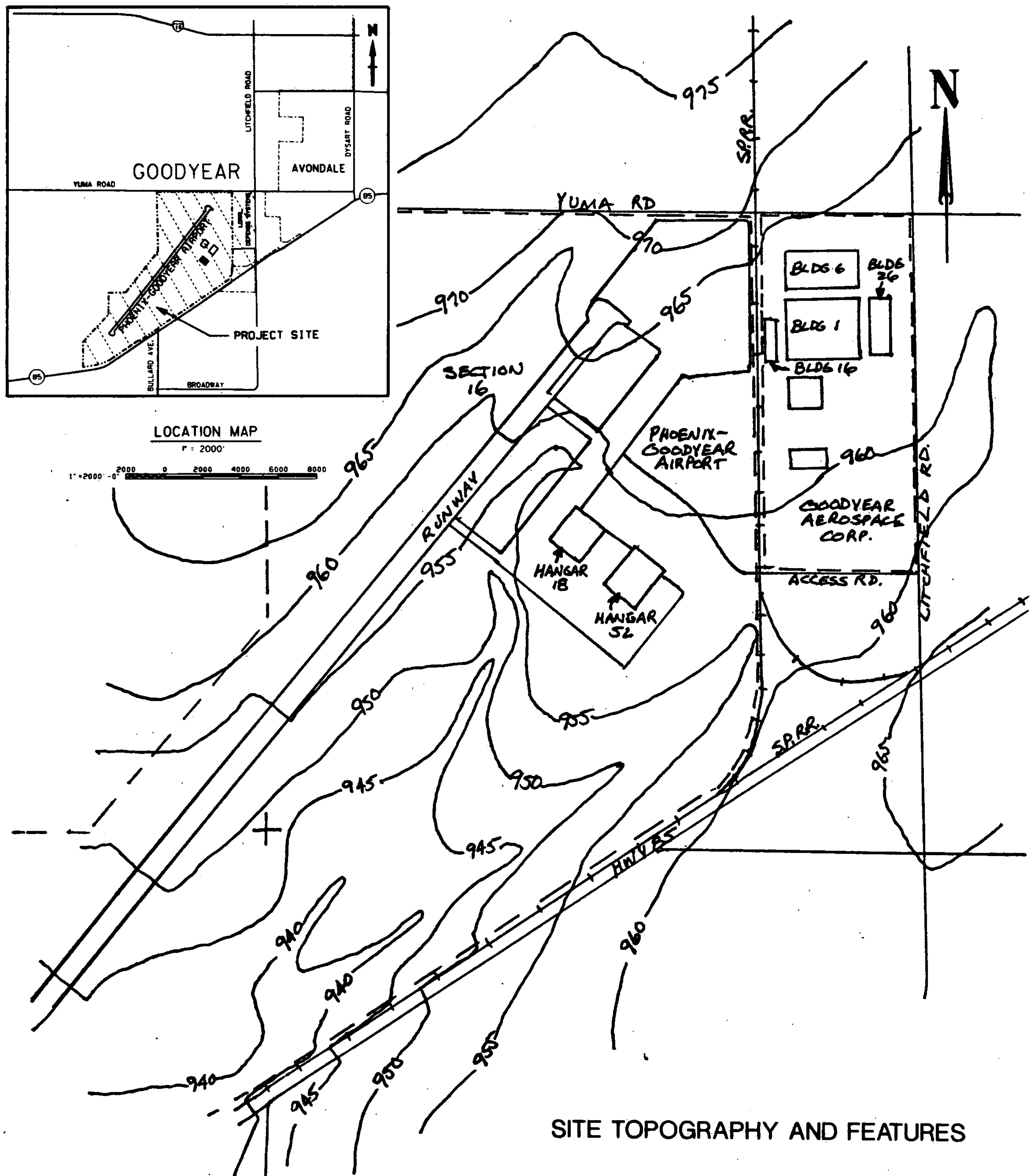
COMPOUND	PG904-20	SVEA1-37
CHLOROMETHANE	ND	ND
BROMOMETHANE	ND	ND
VINYL CHLORIDE	ND	ND
CHLOROETHANE	ND	ND
DICHLOROMETHANE	ND	ND
TRICHLOROFLUOROMETHANE	ND	ND
1,1-DICHLOROETHENE	89.20	29.80
1,1-DICHLOROETHANE	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	ND
CHLOROFORM	58.70	12.20
1,2-DICHLOROETHANE	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND
CARBON TETRACHLORIDE	52.40	9.89
BROMODICHLOROMETHANE	ND	ND
1,2-DICHLOROPROPANE	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND
TRICHLOROETHENE	3080.00	1020.00
DIBROMOCHLOROMETHANE	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND
2-CHLOROETHYLVINYL ETHER	ND	ND
BROMOFORM	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND
TETRACHLOROETHENE	322.00	82.20
CHLOROBENZENE	ND	ND

FIGURES



W63600.FO NOV 1987

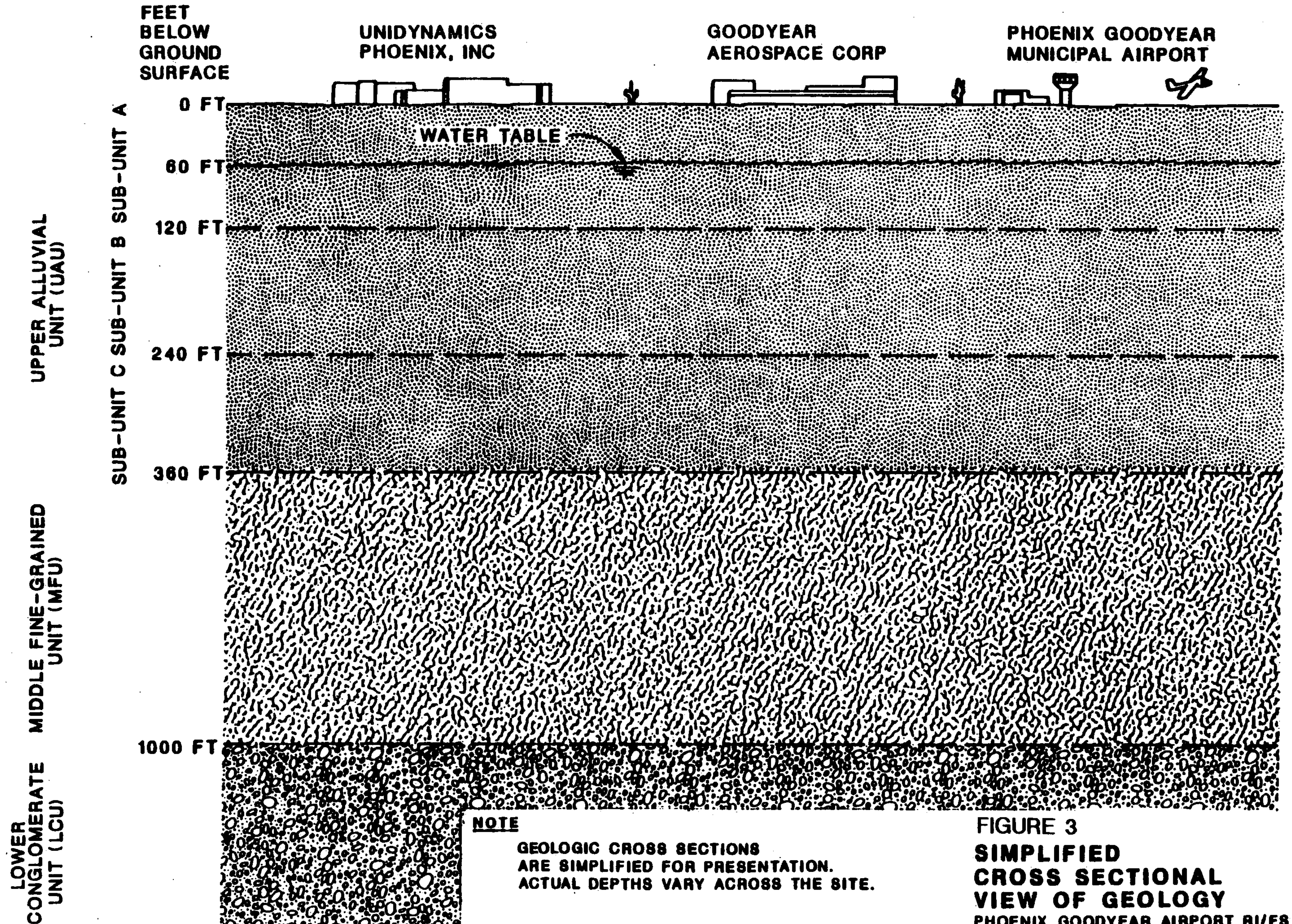
FIGURE 1
SITE LOCATION MAP
PHOENIX-GOODYEAR AIRPORT
REMEDIAL INVESTIGATION



SITE TOPOGRAPHY AND FEATURES

PHOENIX GOODYEAR AIRPORT SITE

FIGURE 2



NOTE

GEOLOGIC CROSS SECTIONS
ARE SIMPLIFIED FOR PRESENTATION.
ACTUAL DEPTHS VARY ACROSS THE SITE.

FIGURE 3
SIMPLIFIED CROSS SECTIONAL VIEW OF GEOLOGY
PHOENIX GOODYEAR AIRPORT RI/FS

RDD63605.AD JUNE 1989

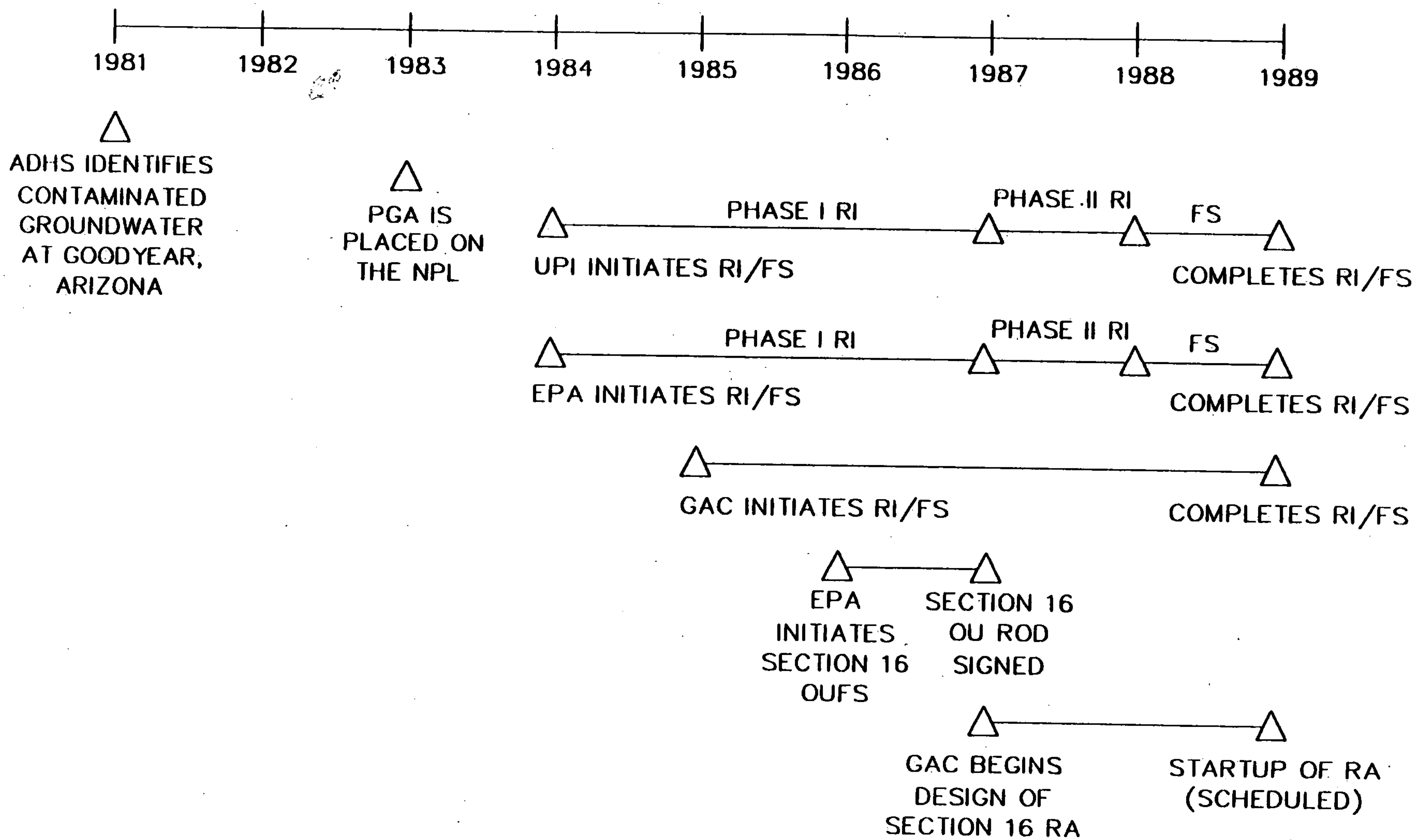
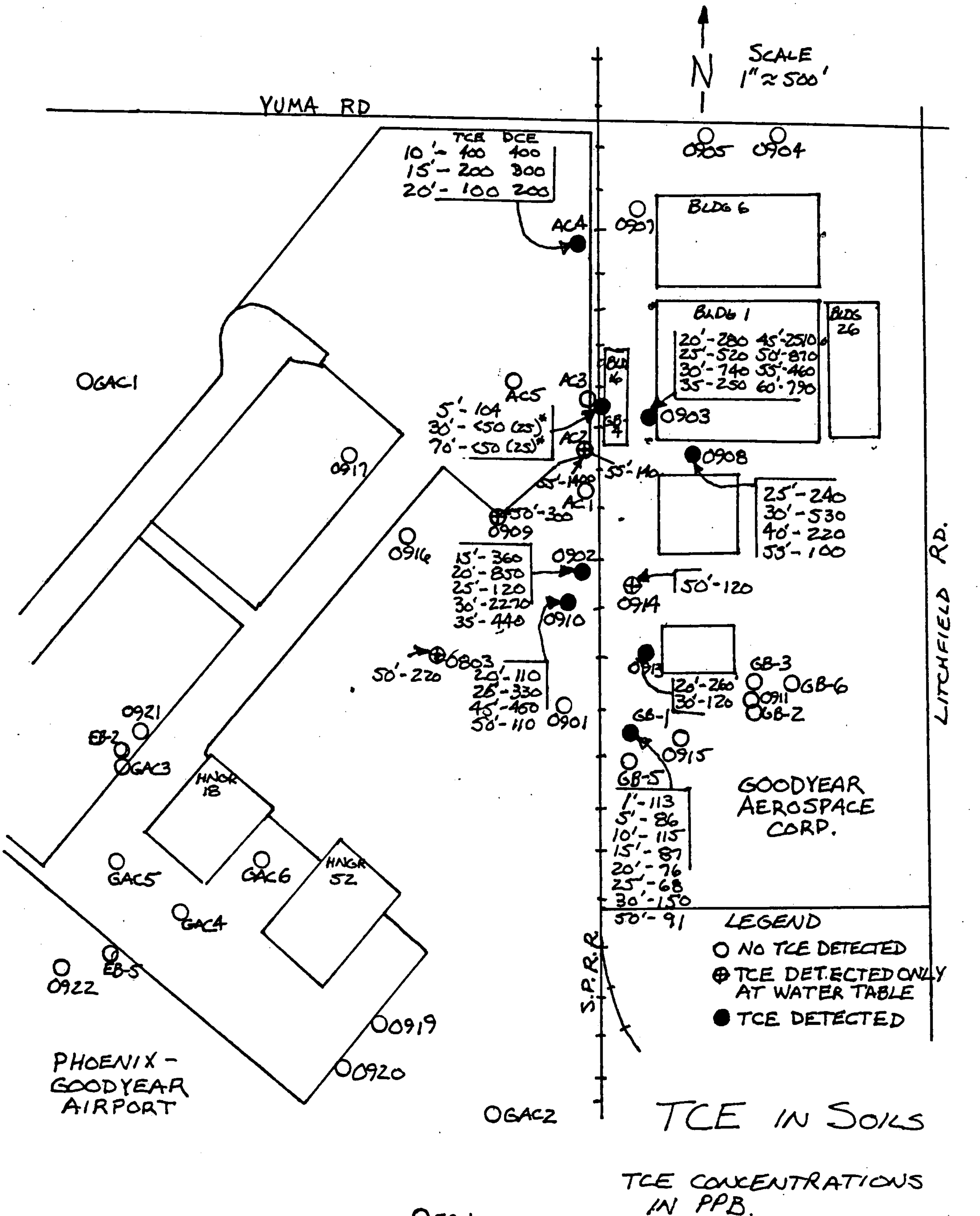


FIGURE ES-3
SUMMARY OF MAJOR ACTIVITIES AT PHOENIX GOODYEAR AIRPORT
PHOENIX GOODYEAR AIRPORT RI/FS

RDD63605.AD JUNE 1989



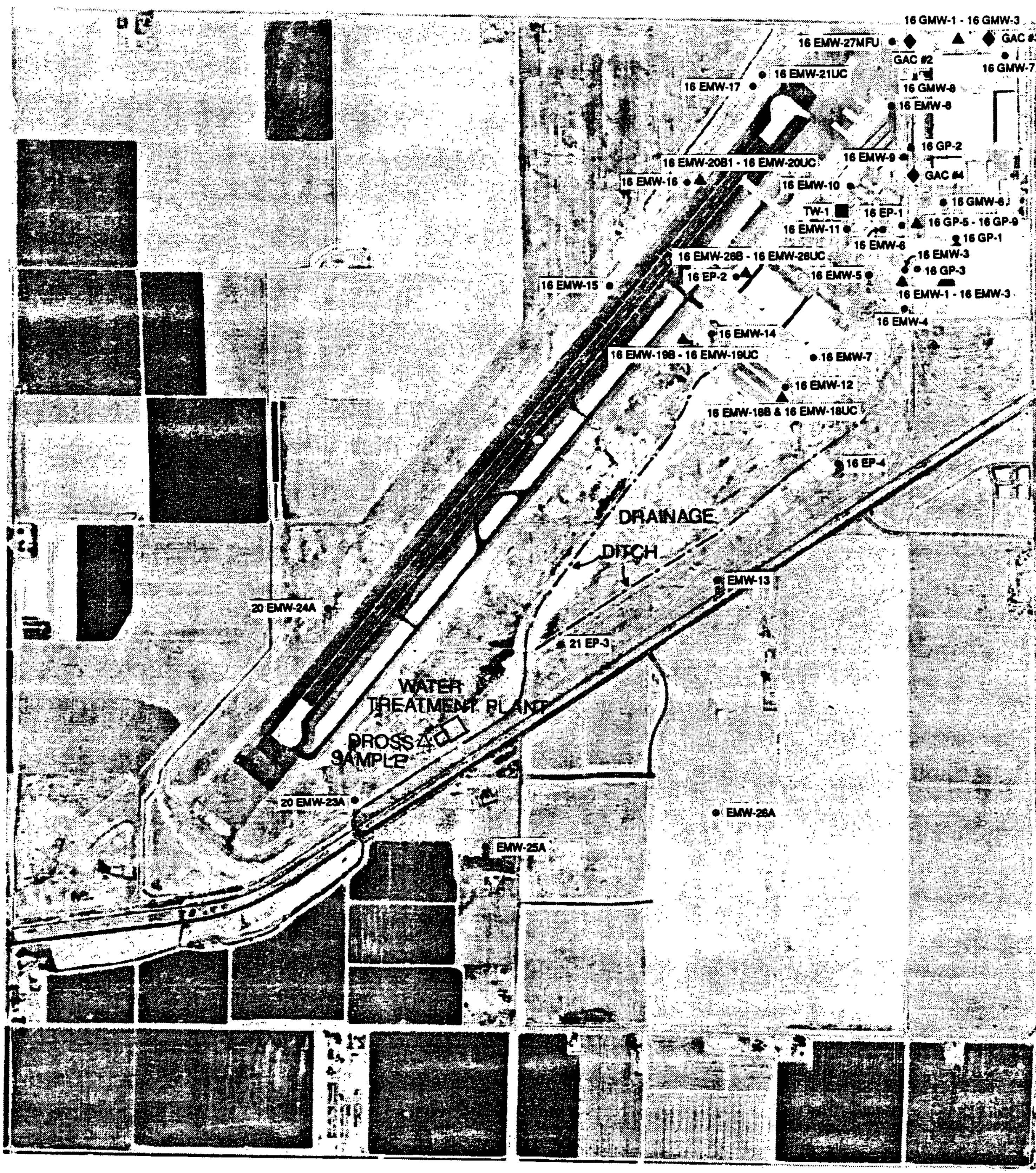
TCE IN SOILS

TCE CONCENTRATIONS IN PPB.

ONLY SAMPLES DETECTING TCE ARE SHOWN.

Note: only GC results shown for Fall 1987 borings

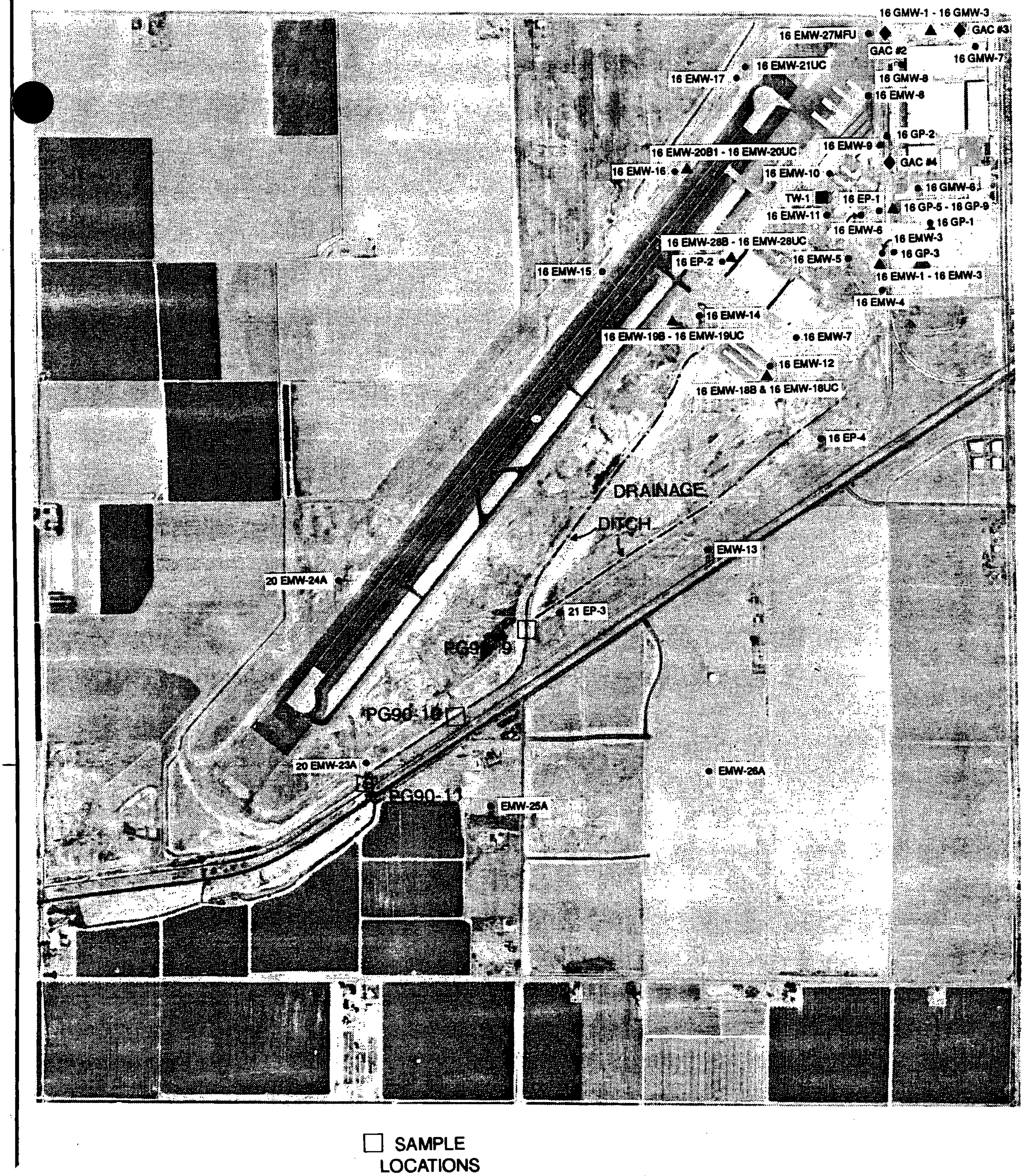
FIGURE 4



△ SAMPLE LOCATION

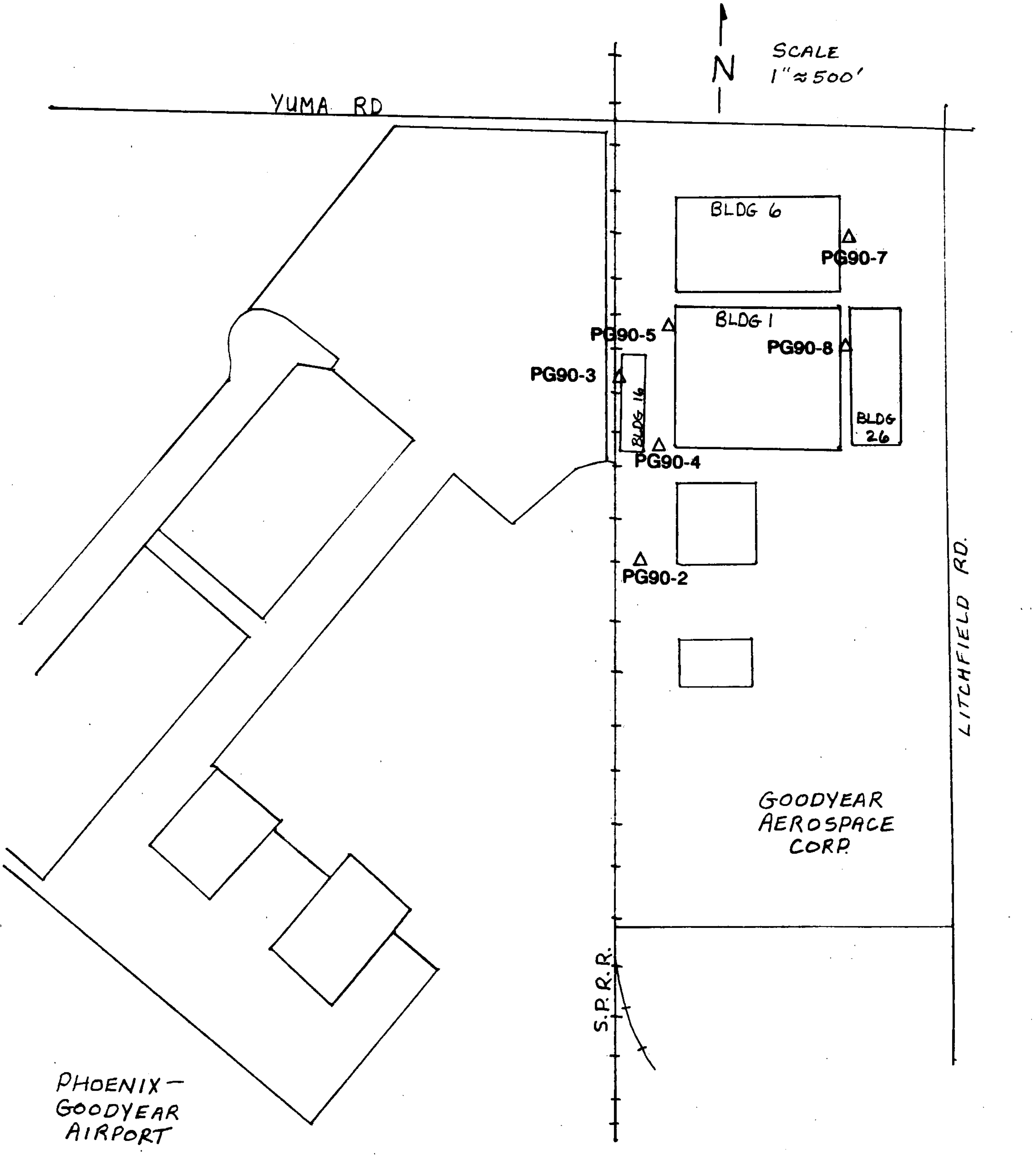
SEDIMENT SAMPLING LOCATION MAP

FIGURE 5



SEDIMENT SAMPLING LOCATION MAP

FIGURE 6



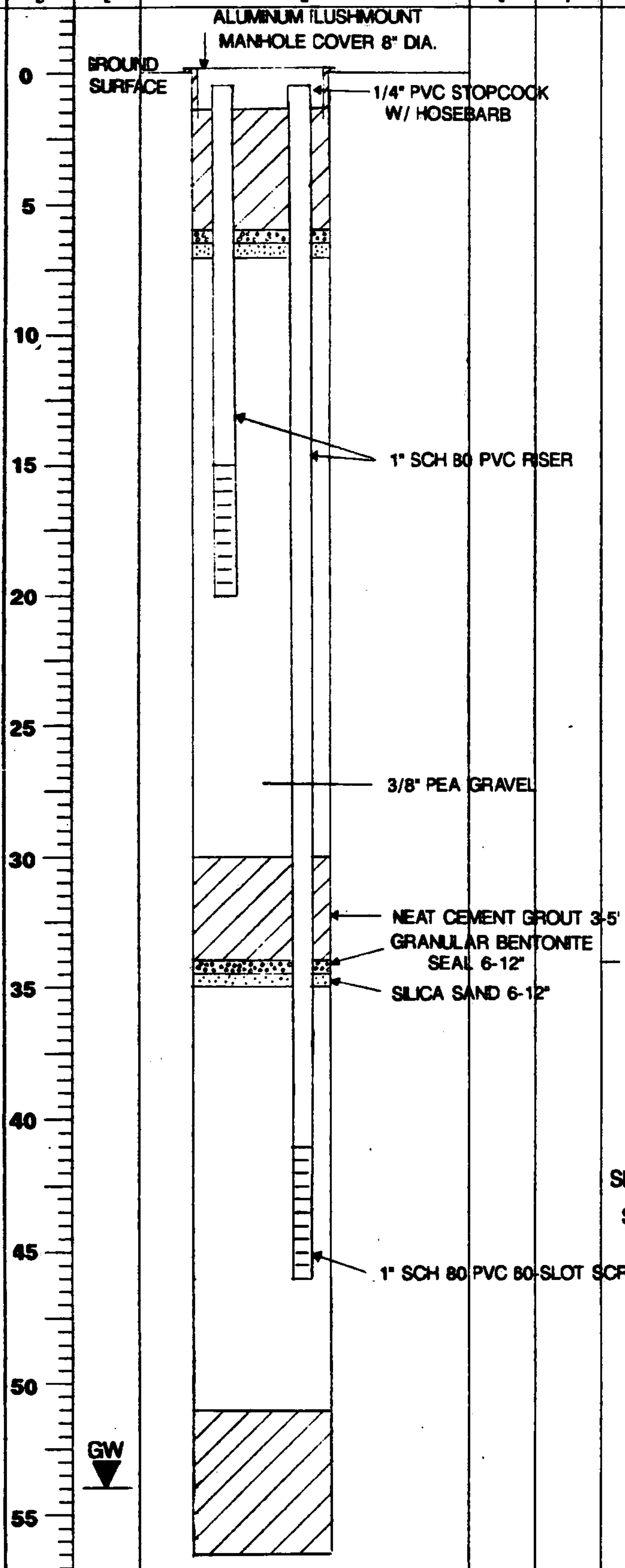
BORING LOCATION MAP

FIGURE 7

DRILLING LOG — **SOIL GAS SAMPLING PORTS** — Hole No. **PG90-3,4,5,8**

PROJECT	INSTALLATION	SHEET
PHOENIX GOODYEAR AIRPORT	LORAL DEFENSE SYSTEMS	OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g



SILTY CLAYS
(CL,ML)

SILTY SAND, GRAVELLY
SAND (SM,SP,GP)

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF - 628-603 | PROJECT | HOLE NO.

FIGURE 8

APPENDIX A

FIELD LOGS

Hole No. PG90-2

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 1 OF 6 SHEETS

1. PROJECT	Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station)	Adjacent to Sewage TP Treatment Plant
3. DRILLING AGENCY	CENCO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number)	PG90-2
5. NAME OF DRILLER	Al Oaks
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	56.5
8. DEPTH DRILLED INTO ROCK	0
9. TOTAL DEPTH OF HOLE	56.5'
10. SIZE AND TYPE OF BIT	6" O.D. (HSA) 3" OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME-75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 16 / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES	—
15. ELEVATION GROUND WATER	Depth to: 54.5'
16. DATE HOLE	STARTED 2-8-90 / COMPLETED 2-9-90
17. ELEVATION TOP OF HOLE	NA
18. TOTAL CORE RECOVERY FOR BORING	— %
19. SIGNATURE OF INSPECTOR	[illegible signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–.45		CONCRETE			8¼" OD HSA TLC then 8" Diamond bit. Cored thru .45' of concrete ID of .55'
	.45–5		Clayey Silt (MH) medium plasticity loose, slightly moist to moist, brown			HNu reading for background = 0.0
	5.0		Clayey silt (MH) med brown color, mod. plasticity, sl. moist to moist, loose	1 (5.5)	5.0 D 2.0	HNu Reading breathing space 0.0 ppm. Blows (N) = 3
	6.0			1 (6.0)	R 1.2	Rec = 1.2'
	6.5			2 (6.5)		HNu (headspace) = 0 ppm moistness probably due to location beneath concrete pad
	7.0			2 (7.0)	7.0	PGA-SB-002-05/VOC Time: 1055

Depth scale: .45, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT Phoenix Goodyear Airport | HOLE NO. PG90-2

Hole No. PG90-2

DRILLING LOG	DIVISION: MRD	INSTALLATION: Phoenix Goodyear Airport	SHEET 2 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): Airport to Sewage TP
3. DRILLING AGENCY: CENTRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-2
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: [x] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 4" CS (HSA), 3" CDS + Steel
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 2-8-90 COMPLETED 2-9-90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	10		becomes drier and has more silt content, low plasticity, med brown color, loose (ML)	3 4	D2.0	N = 9 Rec = 2.0' HNu (background) = <1ppm
	11		Clayey Silt - Silt (ML) low plasticity, loose, dry to slightly moist, medium brown	5 5	R2.0 12.0	HNu (breathing space) = <1ppm HNu (head space) = 0ppm (sample started .2' lower than 10.0' due to slipping rod)
	12					PGA-SB-002-10/VOC Time: 1315
	13					
	14					
	15			2 4	15.0 D2.0	N = 13 Rec = 2.0' HNu (bs) = <1 ppm
	16			9	R2.0	HNu (hs) = <1ppm HNu (background) = <1ppm
	16.5		color change to tan or beige, hard caliche-like, moist, chalky, clay (CL) very little if any silt, low plasticity	13	17.0	PGA-SB-002-15/VOC Time: 1340
	17					
	18		Clay (CL), low plasticity, very stiff - hard, moist, tan.			
	19					
	20					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT: PGA | HOLE NO. PG90-2

Hole No. PG-90-2

DRILLING LOG	DIVISION: MRD	INSTALLATION: Pease, Goodyear Airport	SHEET 3 OF 6 SHEETS

1. PROJECT: Pease, Goodyear Airport	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station): Adjacent to Sewage TP	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: CENRO (CMF-F)	12. MANUFACTURER'S DESIGNATION OF DRILL: CME-5
4. HOLE NO. (As shown on drawing title and file number): PG90-2	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED / UNDISTURBED
5. NAME OF DRILLER: El Dorks	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER
	16. DATE HOLE — STARTED 2-8-90 — COMPLETED 2-9-90
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE: 56.5'	19. SIGNATURE OF INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20		becomes extremely dry and crumbly - still clay (v. fine) (CL)	19	20.0 D1.5	N= 40 Rec= 1.2' HNu (hs) = 1.6 ppm
	21		Clay (CL), low plasticity hard, dry.	19 / 21	R1.2 21.5	HNu (bs) = 0ppm HNu (background) = <1ppm
	22					Driven 1.5' PGA-SB-002-20/VOC Time: 1400
	23					PGA-SB-002/TOC Time: 1400
	24					
	25			6	25.0 D1.5	N= 7 Rec= 1.5'
	25.4		CLAYEY SILT (ML), med brown color, moist, low to moderate plasticity, loose, clay content looks like fat clay	3 / 4	R1.5 26.5	HNu (hs) = 0ppm HNu (bs) = 0ppm HNu (background) = <1ppm
	26					
	27		low to medium plasticity, loose, moist, medium brown			PGA-SB-002-25/VOC Time: 1415
	28					
	29					
	30					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT PGA HOLE NO. PG90-2

Hole No. PG 90-2

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 4 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): Airport to Sewage Pl
3. DRILLING AGENCY: CENPO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-2
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: [x] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD (HSA) 3" OD S. Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 2-8-90 COMPLETED 2-9-90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Jerry E. Pinkerton

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	30		CLAY (CL) very plastic, moist to very moist, med brown color, very soft	1	30.0 D1.5	N= 2 Rec= 1.5' HNu (bs) = 0 ppm HNu (hs) = .2 ppm HNu (background) = 0 ppm (getting reading of ≈ 2 ppm around exhaust of rig)
	31		Clay (CL-CH) high plasticity, very soft, moist to very moist, medium brown	1	R1.5	
				1	31.5	
	32					PGA-SB-002-30/40C Time: 1445
	33					
	34					
	35			5	35.0 D1.5	N= 20 Rec= 1.5' HNu (bs) = 0 ppm HNu (hs) = .3 ppm HNu (background) = <1 ppm
	35.5		becomes Sandy Clay (CL), moist, med to dk brown color, med grained, low plasticity, m. dense v. stiff	8	R1.5	
	35.8 / 36 / 36.2		clay lens runs through at approx. 35.8-36.2	12	36.5	PGA-SB-002-35/40C Time: 1500
	37		Sandy Clay (CL) as above			
	38					
	39					
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT PGA HOLE NO. PG90-2

Hole No. PG90-2

DRILLING LOG	DIVISION: MRD	INSTALLATION: Phoenix Goodyear Airport	SHEET 5 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): Edison & to Senora Tl
3. DRILLING AGENCY: CENRKC (ONEHE)
4. HOLE NO. (As shown on drawing title and file number): PG90-2
5. NAME OF DRILLER: El Ooks
6. DIRECTION OF HOLE: [x] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: ... 3 ...
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 2-8-90 COMPLETED 2-9-90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Kerry S Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40		Sand (gravelly) (SW), moist, no plasticity, coarse grained w/ fine to med gravel, variegated colors from brown to gold very dense (drove sampler through a large rock - picked it up in sample barrel)	43 / 36 / 22	40.0 D1.5 R1.0 41.5	N= 58 Rec= 1.0' HNu (bs) = 0ppm HNu (hs) = 0ppm HNu (background) = 0ppm PGA-SB-002-40/VOC Time: 1525
	41					
	42					
	43		Gravelly Sand, (SW) no plasticity, very dense moist, brown to gold, coarse grained w/ f to med gravel.			
	44					
	45		some large pieces of gravel present - one lense of med grn sand at approx. 45.5'-45.9' otherwise same as above Gravelly Sand (SW)	11 / 18 / 21	45.0 D1.5 R1.3 46.5	N= 39 Rec= 1.3' HNu (bs) = 0ppm HNu (hs) = 2.6 ppm HNu (background) = 0ppm PGA-SB-002-45/VOC Time: 1600 PGA-SB-002/TOC Time: 1600 PGA-SB-002-QC/TOC Time: 1600 PGA-SB-002-QA/TOC Time: 1600
	45.5					
	45.9					
	46					
	47					
	48					
	49					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: PGA HOLE NO. PG90-2

Hole No. PG90-2

DRILLING LOG	DIVISION	INSTALLATION	SHEET 6 OF 6 SHEETS
1. PROJECT: Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT: 6" OD (Ask) 3" OD Split Spoon	
2. LOCATION (Coordinates or Station): Adjacent to Sewage TP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY:		12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75	
4. HOLE NO. (As shown on drawing title and file number): PG90-2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED / UNDISTURBED
5. NAME OF DRILLER: Al Oske		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE	STARTED 2-8-90 / COMPLETED 2-9-90
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE: 56.5'		19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		sand becomes very moist + clay content appears to make it sticky, gravel still present. (SW)	8 / 15 / 31	50.0 / D1.5 / R1.1 / 51.5	N = 46; Rec = 1.1'; HNu (bs) = 0 ppm; HNu (hs) = 1.2 ppm; HNu (background) = 0 ppm
	51–52		Gravelly Sand, med. plasticity, dense, very moist, brown, with clay.			PGA-SB-002-50/VOC Time: 1645
	53					
	54					
	54.5	▼	▼			Water table @ 54.5'
	55–56		Saturated gravelly sand (SW)	15 / 29 / 29	55.0 / D1.5 / R1.2 / 56.5	N = 58; Rec = 1.2'; HNu (bs) = 0 ppm; HNu (hs) = 0.7 ppm; HNu (background) = 0 ppm
	56.5		BOH 56.5'			PGA-SB-002-55/VOC Time: 1725; PGA-SB-002-QA/VOC Time: 1725
	57–59					Grouted 2-9-90

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: PGA HOLE NO. PG90-2

Hole No. PG90-3

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 1 OF 9 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): West of Bldg 16
3. DRILLING AGENCY: CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-3
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: >56.5+
8. DEPTH DRILLED INTO ROCK: 0
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: 54.2'
16. DATE HOLE: STARTED 2-9-90; COMPLETED 2-12-90
17. ELEVATION TOP OF HOLE: N/A
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR: Larry S Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–.65		CONCRETE			8 1/4" OD HSA HEAD then 8" Diamond bit HNu calibration w/ 40 ppm isobutylene HNu (background) = .6ppm oscillates from exhaust from .6 - 1.0 ppm Cored thru .65' of concrete BD = 8.0"
	.65		CLAYEY SILT (MH) low-med. plasticity loose slightly moist to moist med. brown			
	5.0		CLAYEY SILT (MH) med brown color, low-mod plasticity, sl moist to moist, loose	1	D1.5	N (blows) = 2 Rec = 1.5' HNu (background) = .6ppm HNu (headspace) = 0ppm HNu (breathing space) = 1.6ppm
				1	R1.5	
	6.5			1		PGA-SB-003-05/VOC Time: 1510

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: PGA

HOLE NO. PG90-3

Hole No. PG90-3

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 2 OF __ SHEETS

1. PROJECT Phoenix Goodyear Airport	10. SIZE AND TYPE OF BIT 6" OD HSA
2. LOCATION (Coordinates or Station) West of Bldg 16	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY CEWKO (CMART)	12. MANUFACTURER'S DESIGNATION OF DRILL CME 75
4. HOLE NO. (As shown on drawing title and file number)	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 16 — UNDISTURBED —
5. NAME OF DRILLER Al Oaks	14. TOTAL NUMBER CORE BOXES —
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER 54.2'
	16. DATE HOLE — STARTED 2-9-90 — COMPLETED 2-12-90
7. THICKNESS OF OVERBURDEN	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING — %
9. TOTAL DEPTH OF HOLE 56.5'	19. SIGNATURE OF INSPECTOR [illegible signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	10		color chg to mottled tan + brown - less clay mostly silt becomes drier (m. dense) (MH-ML)	3 / 5 / 7	10.0 D1.5 R1.5 11.5	N = 12; Rec = 1.5'; HNu (background) = .6ppm; HNu (bs) .1.8ppm; HNu (hs) = 1.6 ppm; PGA-SB-003-10/VOC Time: 1520
	11					
	12					
	13					
	14					
	15		color chg to tan @ approx. 16.0' very dry m. dense	5 / 8 / 7	15.0 D1.5 R1.2 16.5	N = 15; Rec = 1.2'; HNu (background) = .6ppm; HNu (bs) = 1.8ppm; HNu (hs) = .2ppm; PGA-SB-003-15/VOC Time: 1530
	16					
	17					
	18					
	19					
	20					

ENG FORM MAR 71 1836 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT PGA

HOLE NO. PG90-3

DRILLING LOG | DIVISION: [illegible] | INSTALLATION: [illegible] | Hole No. PG 90-3 | SHEET 3 OF 6 SHEETS

1. PROJECT: [illegible]	10. SIZE AND TYPE OF BIT: 6" OD HSA 3" CS split spoon
2. LOCATION (Coordinates or Station): West of Bldg 16	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: [illegible]	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
4. HOLE NO. (As shown on drawing title and file number):	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED: 16 — UNDISTURBED:
5. NAME OF DRILLER: [illegible]	14. TOTAL NUMBER CORE BOXES:
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 54.2'
7. THICKNESS OF OVERBURDEN:	16. DATE HOLE — STARTED: 2-9-90 — COMPLETED: 2-12-90
8. DEPTH DRILLED INTO ROCK:	17. ELEVATION TOP OF HOLE:
9. TOTAL DEPTH OF HOLE: 56.5'	18. TOTAL CORE RECOVERY FOR BORING: %
	19. SIGNATURE OF INSPECTOR: [illegible]

ELEVATION a	DEPTH b (20')	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. (20.0)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20–21.5		SILTY CLAY (CL) low to no plasticity, med brown color, moist to sl. moist, v. stiff	3 / 9 / 15	D1.5 R1.5 21.5	N = 24 Rec = 1.5' HNu (background) = .6ppm HNu (bz) = 2.3ppm HNu (bs) = .6ppm PGA-SB-003-20/VOC Time: 1545 PGA-SB-003-QC/VOC Time: 1545
	22					
	23					
	24					
	25		chgs to fat clay w/silt (CH), moderately plastic, moist, m. stiff med brn color Fat Clay (CH) medium plasticity med. stiff moist med. brown tr. silt	2 / 2 / 3	25.0 D1.5 R1.5 26.5	N = 5 Rec = 1.5' HNu (background) = .6ppm HNu (bs) = 2.5ppm HNu (bz) = .6ppm PGA-SB-003-25/VOC Time: 1555 PGA-SB-003-QA/VOC Time: 1555
	26					
	27					
	28					
	29					
	30					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT: PGA | HOLE NO. PG90-3

Hole No. PG90-4

DRILLING LOG	DIVISION MRD	INSTALLATION	SHEET 4 OF 5 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): West of Bldg 16
3. DRILLING AGENCY: CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-3
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: 54.2'
16. DATE HOLE: STARTED 2-9-90 | COMPLETED 2-12-90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	30		Fat Clay (CH) as above	2	D1.5	N= 10 Rec= 1.5'
				5	R1.5	HNu (background) = .6ppm
	31			5	31.5	HNu (bs) = .8ppm HNu (hs) = 3.2ppm
	32					PGA-SB-003-30/VOC Time: 1625
						PGA-SB-003/TOC Time: 1625
	33					PGA-SB-003-QC/TOC Time: 1625
	34					PGR-SB-003-QA/TOC Time: 1625
	35				35.0	
	35.4		changes to sand (SP) with silt, tan color, very dense, no plasticity, damoist	5	D1.5	N= 51 Rec= 1.5'
	36		@ 35.9' med - f grained sand	16	R1.5	HNu (background) = .6ppm HNu (bs) = .8ppm
				35	36.5	HNu (hs) = 1.2ppm
	37		very bottom of sample gravelly sand (SW)			PGA-SB-003-35/VOC Time: 1640
	38					
	39					
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: PGA | HOLE NO. PG90-3

Hole No. PG90-3

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 5 OF 8 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): West of Bldg 16
3. DRILLING AGENCY: CEMKO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number):
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" AD HSA 3" OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: 54.2'
16. DATE HOLE: STARTED 2-9-90 | COMPLETED 2-12-90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40.0		Gravelly Sand (SW)	17 / 30 / 22	40.0 D1.5 R1.2 41.5	N=52 Rec=1.2' HNu (background) = .6ppm HNu (bs) = .6ppm HNu (hs) = 1.2ppm
	40.8		changes to a silty, sandy, gravel (or ?), tan color, v. dense, sl moist to moist, no plasticity (trace clay)			PGA-SB-003-40/VOC Time: 1655
	45			9 / 26 / 61	45.0 D1.5 R1.2 46.5	N=87 Rec=1.2' HNu (background) = .6ppm HNu (bs) = .6ppm HNu (hs) = .6ppm
	46		becomes a sandy, gravelly clay (CL) tan to med brown, moist, hard, mod plastic to plastic, (gravel contained approx 1/4" to 1" diameter)			PGA-SB-003-45/VOC Time: 1715
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: PGA | HOLE NO. PG90-3

Hole No. PG-90-3

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 6 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): West of Bldg 16
3. DRILLING AGENCY: CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-3
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER: 54.2'
16. DATE HOLE: STARTED 2-9-90 | COMPLETED 2-12-90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Penny S. Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		Sandy Gravelly Clay (CL) med. plastic to plastic hard moist	12 / 60+	50.0 D 0.7 R 0.7 51.5	N = 60+ Rec = .7' HNu (background) = .6ppm HNu (hs) = 1.1ppm HNu (bs) = .6ppm (refusal for .8')
	51					
	52					PGA-SB-003-50/VOC Time: 1730
	53					
	54					
	55		▼ W.L. during drilling 55.4'	14 / 36 / 45	55.0 D 1.5 R 1.3 56.5	N = 81 Rec = 1.3' HNu (background) = .6ppm HNu (hs) = 1.2ppm HNu (bs) = .6ppm
	56					
	57		BOH @ 56.5'			PGA-SB-003-55/VOC Time: 1755
	58					*Water Level @ 54.2' (2-12-90)
	59					Installed soil vapor ports.
	60					

Hole No. PG-90-4

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 1 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): SW Corner of Bldg 1
3. DRILLING AGENCY: CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-4
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 56.5'+
8. DEPTH DRILLED INTO ROCK: 0
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18 / UNDISTURBED —
14. TOTAL NUMBER CORE BOXES: —
15. ELEVATION GROUND WATER: 53.6'
16. DATE HOLE: STARTED 2-13-90 / COMPLETED 2-14-90
17. ELEVATION TOP OF HOLE: NA
18. TOTAL CORE RECOVERY FOR BORING: — %
19. SIGNATURE OF INSPECTOR: Kenny S Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–.45		CONCRETE			8¼" OD HSA HEAD then 8" Diamond bit
	.45–5		Clayey Silt (MH) low plasticity loose slightly moist med. brown to tan			HNu (background) = .3ppm; cored thru .45' of concrete; Started drilling @ 10:15AM
	5.0–6.5		Clayey silt (MH), med brown to tan, sl moist low plasticity, loose,		1 D1.5 / 1 R1.5 / 2	N (blows) = 3; Rec = 1.5'; HNu (background) = .3ppm; HNu (breathing space) = .5ppm; HNu (headspace) = 13ppm; PGA-SB-004-05/VOC; Time: 10:32
	7–10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT PGA HOLE NO. PG90-4

Hole No. PG90-4

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 2 OF 8 SHEETS

1. PROJECT Phoenix Goodyear Airport	10. SIZE AND TYPE OF BIT 6" OD HSA 2" CDSS + Spoon
2. LOCATION (Coordinates or Station) SW Corner of Bldg	11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
3. DRILLING AGENCY CEMRO (OMAHA)	12. MANUFACTURER'S DESIGNATION OF DRILL CME 75
4. HOLE NO. (As shown on drawing title and file number) PG90-4	13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED 18 — UNDISTURBED
5. NAME OF DRILLER Al Oaks	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER 53.6'
	16. DATE HOLE — STARTED 2-13-90 — COMPLETED 2-14-90
7. THICKNESS OF OVERBURDEN 56.5'	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE 56.5'	19. SIGNATURE OF INSPECTOR [illegible] S Brockman

ELEVATION a	DEPTH (ft) b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	10		Clayey silt (ML) color change to mottled tan + brown, a little dryer w/small pebbles	3 / 4 / 5	10.0 D1.5 R1.3 11.5	N=9 Rec=1.3' HNu (background) = .3ppm HNu (bs) = 1.5ppm HNu (hs) = 50ppm
	11					
	12					PGA-SB-004-10/VOC Time: 10:50 PGA-SB-004/TOC Time: 10:50
	13					
	14					
	15		CLAY (CL) mod. plasticity, med brn color, stiff, sl moist to moist, no pebbles (borders on fat clay) (CL-CH)	2 / 5 / 7	15.0 D1.5 R1.5 16.5	N=12 Rec=1.5' HNu (background) = .3ppm HNu (bs) = 2.0ppm HNu (hs) = 45ppm
	16					
	17					PGA-SB-004-15/VOC Time: 11:00
	18					
	19					
	20					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT PGA HOLE NO. PG90-4

Hole No. PG90-4

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 3 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 4" ID HSA 3" OD Spl + Spoon	
2. LOCATION (Coordinates or Station) SW Corner of Bldg 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-4		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 18 — UNDISTURBED	
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.6'	
		16. DATE HOLE — STARTED 2-13-90 — COMPLETED 2-14-90	
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR [signature]	

ELEVATION a	DEPTH 20 b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. 20' f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			becomes dry clay (CL) w/silt; powdery, hard	22 / 59 / 60+	D1.3 / R1.3 / 21.5	N= 119 (60+) Rec= 1.3' HNu (backgrnd) = .3ppm HNu (hs) = ppm HNu (bs) = .7ppm refusal for last 3" of shoe PGA-SB-004-20/VOC Time: 11:14 PGA-SB-004/QC/VOC Time: 11:14
	21					
	22					
	23					
	24					
	25				25.0	
			becomes moist, silty clay (CL) contains metallic chips (mica), med brn color, m. stiff moderately plastic to plastic (fat clay?) (CL-CH)	2 / 3 / 2	D1.5 / R1.5 / 26.5	N= 5 Rec= 1.5' HNu (backgrnd) = .3ppm HNu (bs) = .7ppm HNu (hs) = 70 ppm PGA-SB-004-25/VOC Time: 11:31 PGA-SB-004-QA/VOC Time: 11:31
	26					
	27					
	28					
	29					
	30					

Hole No. PG90-4

DRILLING LOG

DIVISION	MRD
INSTALLATION	Phoenix Goodyear Airport
SHEET	4 OF 4 SHEETS
1. PROJECT	Phoenix Goodyear Airport
10. SIZE AND TYPE OF BIT	6" OD HS 3" OD Split Spoon
2. LOCATION (Coordinates or Station)	
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
3. DRILLING AGENCY	CENRO (OMAHA)
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 75
4. HOLE NO. (As shown on drawing title and file number)	PG90-4
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED: 18 / UNDISTURBED:
5. NAME OF DRILLER	Al Oaks
14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE	VERTICAL (checked) / INCLINED ___ DEG. FROM VERT.
15. ELEVATION GROUND WATER	53.6'
16. DATE HOLE	STARTED: 2-13-90 / COMPLETED: 2-14-90
7. THICKNESS OF OVERBURDEN	56.5'
17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK	
18. TOTAL CORE RECOVERY FOR BORING	%
9. TOTAL DEPTH OF HOLE	56.5'
19. SIGNATURE OF INSPECTOR	Terry L. Bimkman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	30.0		Sandy Silt (ML) moist, tan to med brn color, m. dense low plasticity to med. (metallic chips) mica	4 / 7 / 9	30.0 D1.5 R1.5 31.5	N = 16; Rec = 1.5'; HNu (background) = .3ppm; HNu (bs) = .7ppm; HNu (hs) = 80ppm; PGA-SB-004-30/VOC Time: 12:58; PGA-SB-004/TOC Time: 12:58; PGA-SB-004-QC/TOC Time: 12:58; PGA-SB-004-QA/TOC Time: 12:58
	31					
	32					
	33					
	34					
	35		Sand (SP) tan color, moist, no to low plast., m. dense; basically a med grn. sand (metallic chips) mica	7 / 10 / 14	35.0 D1.5 R1.2 36.5	N = 24; Rec = 1.2'; HNu (background) = .3ppm; HNu (bs) = .3ppm; HNu (hs) = 4.0ppm; PGA-SB-004-35/VOC Time: 13:10
	36					
	37					
	38					
	39					
	40					

Hole No. PG90-4

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 5 OF 7 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6 1/4" ID HSA 3" OD Split Spoon	
2. LOCATION (Coordinates or Station) SW Corner of Bldg "1"		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-4		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 18 — UNDISTURBED	
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE — STARTED 2-13-90 — COMPLETED 2-14-90	
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Glenn S Brockman	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40.0		SAND (SP) becomes golden tan color, larger grns, some pebbles, moist	7	40.0	N = 29 Rec = 1.1'
	41			17	D1.5 R1.1	HNu (background) = .3ppm HNu (bs) = .7ppm
	41.3		starts to have some clay content, more moist	12	41.5	HNu (hs) = 20ppm
	42					When we started to take 40' sample HNu pegged out – reset it & got approx 700 ppm. Stopped work to aerate borehole. Recalibrated HNu & got reading of 500 ppm. Will Monitor Breathing Zone closer! After aeration reading was 3 ppm
	43		PGA-SB-004-40/VOC Time: 1352			
	44					
	45		same as above but more pebbles + cobbles, less clay, v. dense	9	45.0	N = 58 Rec = 1.1'
	46			23	D1.5 R1.1	HNu (background) = .3ppm HNu (bs) = .3ppm
				35	46.5	HNu (hs) = 4.0ppm
	47					PGA-SB-004-45/VOC Time: 1420
	48					
	49					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT PGA | HOLE NO. PG90-4

Hole No. PG90-4

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 6 OF 7 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6" OD Lin A 3" ...	
2. LOCATION (Coordinates or Station) SW Corner of Bldg 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-4		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED	
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.6'	
		16. DATE HOLE: STARTED 2-13-90; COMPLETED 2-14-90	
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Penny S. Brokman	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50		Sand (SP) Zone in barrel @ approx. 51.0' where a gray color change took place - then changed back to med-brown (numerous pebbles and 2 cobbles)	13 / 34 / 60+	50.0 D1.4 R1.0 51.5	N = 60+ Rec = 1.0' HNu (background) = .3ppm HNu (bs) = .3ppm HNu (hs) = 11.0ppm
	51					
	52					Got reading of 500ppm at borehole again: so aerated borehole (at 50' before sampling) Measured again & got 1.0 ppm
	53					Refusal @ 51.4'
	53.6 ▼					PGA-SB-004-50/VOC Time: 1450
	54					
	55			10 / 21 / 26	55.0 D1.5 R1.1 56.5	N = 47 Rec = 1.1' HNu (background) = .3ppm HNu (bs) = .5ppm HNu (hs) = 30ppm
	56					
			BOH = 56.5			
	57					Reading of 200ppm at borehole in augers
	58					PGA-SB-004-55/VOC Time: 1512
						Barrel Composite Time: 1512
	59					Installed soil vapor ports.
	60					

Hole No. PG90-5

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 1 of 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6"OD HSA 3" OD Split Spoon	
2. LOCATION (Coordinates or Station) NW Corner of Bldg. 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-5		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED —	
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.6	
		16. DATE HOLE: STARTED 2-15-90; COMPLETED 2-15-90	
7. THICKNESS OF OVERBURDEN 56.5'+		17. ELEVATION TOP OF HOLE NA	
8. DEPTH DRILLED INTO ROCK 0		18. TOTAL CORE RECOVERY FOR BORING — %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR [signature]	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–.5		CONCRETE			Cored through concrete 8"4" OD HSA then 8" diamond bit; concrete thickness .5'
	.5–5		Clayey Silt (ML) low plasticity loose moist med. brown			HNu (background) = .2ppm when calibrating the HNu the span on the gas read high
	5–6.5		CLAYEY SILT (ML) med brn color, low plasticity, loose @ ≈ 6.1' color chg to tan	2 2 3	5.0 D1.5 R1.0 6.5	N(blows) = 5 Rec = 1.0' HNu (background) = .2ppm HNu (breathing space) = .2ppm HNu (head space) = 1.2ppm PGA-SB-005-05/VOC Time: 9:15

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT PGA | HOLE NO. PG90-5

Hole No. PG90-5

DRILLING LOG	DIVISION: MRD	INSTALLATION: Phoenix Goodyear Airport	SHEET 2 OF 6 SHEETS
1. PROJECT: Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Split Spoon	
2. LOCATION (Coordinates or Station): NW Corner of Bldg. 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL	
3. DRILLING AGENCY: CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75	
4. HOLE NO. (As shown on drawing title and file number): PG90-5		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED: 18 — UNDISTURBED:	
5. NAME OF DRILLER: Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER: 53.6'	
7. THICKNESS OF OVERBURDEN: 56.5'		16. DATE HOLE — STARTED: 2-15-90 — COMPLETED: 2-15-90	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE: 56.5'		18. TOTAL CORE RECOVERY FOR BORING %	
		19. SIGNATURE OF INSPECTOR: [signature]	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	10		Clayey Silt (ML) ~~lean clay~~ - tan-brn color	3 / 4 / 5	D1.5 / R1.0 / 11.5	N= 9; Rec= 1.0'; HNu (bg) = .2ppm; HNu (bs)= .2ppm; HNu (hs)= .4ppm; PGA-SB-005-10/VOC Time: 9:23; PGA-SB-005/TOC Time: 9:23
	11					
	12					
	13					
	14					
	15		chg to CLAY (CL) mottled tan & brown, med plasticity, v. stiff, sl moist	12 / 13 / 13	15.0 / D1.5 / R1.5 / 16.5	N= 26; Rec= 1.5'; HNu (bg) = .2ppm; HNu (bs) = .2ppm; HNu (hs) = 12ppm; PGA-SB-005-15/VOC Time: 9:30
	16					
	17					
	18					
	19					
	20					

Hole No. PG90-5

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 3 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6" OD HSA 3" ODS + Spoon	
2. LOCATION (Coordinates or Station) NW corner of Bldg. 1		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME75	
4. HOLE NO. (As shown on drawing title and file number) PG90-5		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 18 / UNDISTURBED
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.6'	
		16. DATE HOLE	STARTED 2-15-90 / COMPLETED 2-15-90
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK —		18. TOTAL CORE RECOVERY FOR BORING	%
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Lenny S Brockman	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20.0		Clay (CL) med. plasticity very stiff slightly moist mottled tan and brown	22	20.0	N= 31
				14	D1.5	Rec = 1.2'
	21			17	R1.2	HNu (bg) = .2ppm
					21.5	HNu (bs) = .2ppm HNu (hs) = 5ppm
	22					PGA-SB-005-20/voc Time: 9:45
	23					PGA-SB-005-QC/voc Time: 9:45
	24					
	25		becomes med. brn color	3	25.0	N= 4
				2	D1.5	Rec = 1.5'
	26			2	R1.5	HNu (bg) = .2ppm HNu (bs) = .2ppm
					26.5	HNu (hs) = 18ppm
	27					PGA-SB-005-25/voc Time: 9:57
						PGA-SB-005-QA/voc Time: 9:57
	28					
	29					
	30					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT PGA HOLE NO. PG90-5

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 4 OF 6 SHEETS

Hole No.

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): NW Corner of Bldg 1
3. DRILLING AGENCY: CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-5
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 56.5'
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" ID HSA 3" OD Split spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18 UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 53.6'
16. DATE HOLE: STARTED 2-15-90 COMPLETED 2-15-90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Penny S Brackman

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
	30.0		becomes plastic, more moist, v. stiff Clay (CL-CH)	5 / 7 / 9	30.0 D1.5 R1.5 31.5	N= 16 Rec = 1.5' HNu (bg) = .2 ppm HNu (bz) = .2 ppm HNu (hs) = 7 ppm PGA-SB-005-30/VOC Time: 10:15 PGA-SB-005-30/TOC Time: 10:15 PGA-SB-005/TOC Time: 10:15 PGA-SB-005-QA/TOC Time: 10:15
	31					
	32					
	33					
	34					
	35		SAND (SW) f. to med. grn mostly w/some coarse grns, tan color, m. dense, no plasticity, moist.	12 / 20 / 24	35.0 D1.5 R1.4 36.5	N= 44 Rec = 1.4' HNu (bg) = .2 ppm HNu (bz) = .2 ppm HNu (hs) = 2 ppm PGA-SB-005-35/VOC Time: 10:52
	36					
	37					
	38					
	39					
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: PGA | HOLE NO. PG90-5

DRILLING LOG | DIVISION: MRD | INSTALLATION: Phoenix Goodyear Airport | Hole No. PG90-5 | SHEET 5 of 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): NW Corner of Bldg 1
3. DRILLING AGENCY: CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-5
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: [X] VERTICAL [ ] INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 56.5'
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6"OD HSA 3"OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): msl
12. MANUFACTURER'S DESIGNATION OF DRILL: cme 75
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 53.6'
16. DATE HOLE: STARTED 2-15-90 | COMPLETED 2-15-90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Yemm S Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40		Sand (SW) as above	8	40.0	N = 27
				9	D1.5	Rec = 1.0'
	41		becomes clayey and contains pebbles v. coarse sand m. dense Clayey Sand.	18	R1.0	HNu(bg) = .2ppm; HNu(bs) = .2ppm; HNu(hs) = 2.5 ppm
					41.5	
	42					PGA-SB-005-40/VOC Time: 11:03
	43					
	44					
	45		Sandy, gravelly, clay (CL) varigated color from tan to dk brn, banded, mod. plastic, moist.	12	45.0	N = 51
				20	D1.5	Rec = 1.1'
	46			31	R1.1	HNu(bg) = .2ppm; HNu(bs) = .2ppm; HNu(hs) = 5ppm
					46.6	
	47					PGA-SB-005-45/VOC Time: 11:18
	48					
	49					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT: PGA | HOLE NO. PG90-5

DRILLING LOG | DIVISION: MRD | INSTALLATION: Phoenix Goodyear Airport | Hole No. PG90-5 | SHEET 6 OF 6 SHEETS

1. PROJECT	Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station)	NW Corner of Bldg 1
3. DRILLING AGENCY	CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number)	PG90-5
5. NAME OF DRILLER	Al Oaks
6. DIRECTION OF HOLE	☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	56.5'
8. DEPTH DRILLED INTO ROCK	—
9. TOTAL DEPTH OF HOLE	56.5'
10. SIZE AND TYPE OF BIT	6" OD HSA 3" OD Split spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 75
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED: 78 / UNDISTURBED:
14. TOTAL NUMBER CORE BOXES	
15. ELEVATION GROUND WATER	53.6'
16. DATE HOLE	STARTED 2-15-90 / COMPLETED 2-15-90
17. ELEVATION TOP OF HOLE	
18. TOTAL CORE RECOVERY FOR BORING	%
19. SIGNATURE OF INSPECTOR	Penny C. Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	50.6		chgs to a clayey, gravelly sand (SC), moist, mod-low plasticity, v.dense tan-brown color	21 / 60	50.0 D.9 R.9 51.5	N = 60+ Rec = .9' HNu (bg) = .2 ppm HNu (bs) = .4 ppm HNu (hs) = 7 ppm refusal @ 50.8'
	52					PGA-SB-005-50/voc Time: 11:35
	53					
	53.6	▼				
	54					
	55		Saturated @ 55.5'	13 / 20 / 8	55.0 D1.5 R.9 56.5	N = 28 Rec = .9' HNu(bg) = .2 ppm HNu(bs) = 1.6 ppm HNu(hs) = 1.4 ppm
	56		BOH = 56.5'			
	57					Water level @ 53.6'
	58					PGA-SB-005-55/voc Time: 11:52
	59					Installed soil vapor ports.
	61					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT: PGA | HOLE NO. PG90-5

Hole No. PG90-7

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 1 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6 5/8" HSA 3" OD Split Spn	
2. LOCATION (Coordinates or Station) E. of Bldg 6		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (on AHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-7		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 18 / UNDISTURBED —
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
		16. DATE HOLE	STARTED 2-19-90 / COMPLETED 2-20-90
7. THICKNESS OF OVERBURDEN 56.5'+		17. ELEVATION TOP OF HOLE NA	
8. DEPTH DRILLED INTO ROCK 0		18. TOTAL CORE RECOVERY FOR BORING — %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Penny S Brockman	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			CONCRETE			Cored through concrete w/8¼" OD HSA then 8" diamond bit
	.62					concrete thickness .62'
	1		Sandy Silt (ML) low plasticity loose moist med. brown			
	2					HNu (background) = .4ppm
	3					
	4					
	5				5.0	
			Sandy silt (ML) med brown color, low plasticity, loose, moist	2	D1.5	N(blows) = 3 Rec = .9
	6			2	R.9	HNu (background) = .4ppm
				1	6.5	HNu (breathing space) = .4ppm HNu (headspace) = .2ppm
	7					PGA-SB-007-05/VOC Time: 1405
	8					
	9					
	10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT PGA

HOLE NO. PG90-7

Hole No. PG90-7

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 2 OF 6 SHEETS

1. PROJECT Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station) E. of Bldg 6
3. DRILLING AGENCY CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number) PG90-7
5. NAME OF DRILLER Al Oaks
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN 56.5'
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 56.5'
10. SIZE AND TYPE OF BIT 6 1/4 HSA 3" OD Split Sp.
11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL
12. MANUFACTURER'S DESIGNATION OF DRILL CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED 18 — UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER 52.9'
16. DATE HOLE — STARTED 2-19-90 — COMPLETED 2-20-90
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR [illegible]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sandy Silt (ML) becomes gravelly	3 / 6 / 11	10.0 / D1.5 / R1.0 / 11.5	N = 17 Rec = 1.0 HNu (bg) = .4ppm HNu (bs) = .4ppm HNu (hs) = .8ppm PGA-SB-007-10/VOC Time: 1412 PGA-SB-007/TOC Time: 1412
	11					
	12					
	13					
	14					
	15		CLAY (CL) v. stiff, med brown & tan color, dry chgs to moist, m. plasticity	7 / 6 / 13	15.0 / D1.5 / R1.5 / 16.5	N = 19 Rec = 1.5 HNu (bg) = .4ppm HNu (bs) = .8ppm HNu (hs) = .6ppm PGA-SB-007-15/VOC Time: 1418
	16					
	17					
	18					
	19					
	20					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT PGA — HOLE NO. PG90-7

Hole No. PG90-7

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear	SHEET 3 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): E. of Bldg 6
3. DRILLING AGENCY: CEMRO OMAHA
4. HOLE NO. (As shown on drawing title and file number): PG90-7
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 56.5'
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Spl. Spn
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 52.9'
16. DATE HOLE: STARTED 2-19-90 | COMPLETED 2-20-90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Perm S Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20		becomes Sandy silt (ML) med brown color, m. dense, sl moist, low plasticity (w/clay)	3 / 5 / 6	20.0 / D1.5 / R1.2 / 21.5	HNu (background) = .4 ppm; HNu (bs) = 1.5 ppm; HNu (hs) = 5 ppm; N = 11; Rec = 1.2
	21					
	22					PGA-SB-007-20/VOC Time: 1428
	23					PGA-SB-007-QC/VOC Time: 1428
	24					
	25		SILTY CLAY (CL) med brown, moist, med. plastic, soft	e / e / 3	25.0 / D1.5 / R1.5 / 26.5	N = 6; Rec = 1.5; HNu (background) = .4 ppm; HNu (bs) = .9 ppm; HNu (hs) = 5.0 ppm
	26					
	27					PGA-SB-007-25/VOC Time: 1440
	28					PGA-SB-007-QA/VOC Time: 1440
	29					
	30					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT PGA | HOLE NO. PG90-7

Hole No.

DRILLING LOG	DIVISION: MRD	INSTALLATION: Phoenix Goodyear Project	SHEET 7 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport	10. SIZE AND TYPE OF BIT: 6"OD HSA 3"OD Split Spn
2. LOCATION (Coordinates or Station): E of Bldg C	11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
3. DRILLING AGENCY: CEMRO OMAHA	12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
4. HOLE NO. (As shown on drawing title and file number): PG90-7	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED
5. NAME OF DRILLER: Al Oaks	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.	15. ELEVATION GROUND WATER: 52.9'
	16. DATE HOLE: STARTED 2-19-90; COMPLETED 2-20-90
7. THICKNESS OF OVERBURDEN: 56.5'	17. ELEVATION TOP OF HOLE
8. DEPTH DRILLED INTO ROCK	18. TOTAL CORE RECOVERY FOR BORING %
9. TOTAL DEPTH OF HOLE: 56.5'	19. SIGNATURE OF INSPECTOR: Kenny S Brackman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	30		Sandy CLAY (CL) med brn, plastic, stiff, sl. moist to moist.	4 / 5 / 6	D1.5 / R1.5 / 31.5	N= 11 Rec = 1.5' HNu (bg) = .4ppm HNu (bs) = .4ppm HNu (hs) = .6ppm
	31					
	32					PGA-SB-007-30/VOC Time: 1450
	33					PGA-SB-007/TOC Time: 1450 PGA-SB-007-QC/TOC Time: 1450
	34					PGA-SB-007-QA/VOC Time: 1450
	35		Becomes sand Clayey SAND med. tan color, moist, loose, low plasticity.	2 / 3 / 6	35.0 / D1.5 / R1.5 / 36.5	N= 9 Rec = 1.5 HNu (bg) = .4ppm HNu (bs) = .6ppm HNu (hs) = 3.1ppm
	36					
	37					PGA-SB-007-35/VOC Time: 1510
	38					
	39					
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT: PGA HOLE NO. PG90-7

Hole No. PG90-7

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Project	SHEET 5 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): E of Bldg 6
3. DRILLING AGENCY: CEMRO OMAHA
4. HOLE NO. (As shown on drawing title and file number): PG 90-7
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 56.5'
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Spl't Spn
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 52.9'
16. DATE HOLE: STARTED 2-19-90 | COMPLETED 2-20-90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Kenny S Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40		Sand - Clayey Sand (SP) large gravel present	30 / 26 / 7	40.0 / D1.5 / R1.0 / 41.5	N = 33; Rec = 1.0'; HNu (bg) = .4ppm; HNu (bs) = .6ppm; HNu (hs) = 8.8ppm
	41		becomes CLAY (CL) med brown color, mettalic flakes or mica present plastic, m. stiff (lots of silt) moist.			PGA-SB-007-40/VOC TIME 1515
	42					
	43					
	44					
	45		Gravelly, sandy clay, (CL), med brown, moist, hard, med to sl. plastic, gravel pieces - small to coarse.	12 / 16 / 21	45.0 / D1.5 / R1.0 / 46.5	N = 37; Rec = 1.0'; HNu (bg) = .4ppm; HNu (bs) = .6ppm; HNu (hs) = 7.2ppm
	46					
	47					PGA-SB-007-45/VOC TIME 1535
	48					
	49					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT: PGA | HOLE NO. PG90-7

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Project	SHEET 6 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6.0" HSA 3" 6DSpt spn	
2. LOCATION (Coordinates or Station) E of Bldg 6		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO OMAHA		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-7		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 18 / UNDISTURBED
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 52.9'	
		16. DATE HOLE	STARTED 2-19-90 / COMPLETED 2-20-90
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK —		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Penny S Buckman	

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
	50		CLAYEY GRAVEL (GC) Brn-Grn color, lg pieces of gravel, v. dense, low plasticity, moist	10 / 21 / 43	50.0 / D1.5 / R1.2 / 51.5	N= 64 Rec = 1.2' HNu (bg) = .4ppm HNu (bs) = .4ppm HNu (hs) = .4ppm PGA-SB-007-50/voc TIME 0910
	51					
	52					
	52.9	▼				
	53					Extremely hard drilling - twisted off augers - tried to retrieve them - got them out
	54					
	55		Saturated gravel w/clay (same as above)	14 / 40 / 27	55.0 / D1.5 / R1.1 / 56.5	N= 67 Rec = 1.1' HNu (bg) = .4ppm HNu (bs) = .4ppm HNu (hs) =
	56					
	56.5		BOH @ 56.5'			
	57					Water level @ 52.9'
	58					PGA-SB-007-55/voc TIME: 1018
	59					Barrel Composite Sample from 0'-56.5'
	60					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT PGA HOLE NO. PG-90-7

Hole No. PG90-8

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 1 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6"OD HSA; 3"OD split spoon	
2. LOCATION (Coordinates or Station) Betw. Bldgs 1 & 2A		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-8		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 18 / UNDISTURBED —
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES —	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.3'	
		16. DATE HOLE	STARTED 2-16-90 / COMPLETED 2-19-90
7. THICKNESS OF OVERBURDEN 56.5'+		17. ELEVATION TOP OF HOLE NA	
8. DEPTH DRILLED INTO ROCK 0		18. TOTAL CORE RECOVERY FOR BORING — %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Penny S Brokaw	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0–.6		CONCRETE			Cord thru concrete w/ 8¼" OD HSA then 8" diamond bit
	.6		Silt (ML) low plasticity loose slightly moist med. brown with fine grain sand.			concrete thickness .6' HNu (background) = .8ppm
	5		SILT (ML), loose, med. brown, low plasticity, sl. moist, w/ sand) f. grn	2	5.0	N (blows) = 5 Rec = 1.3'
				2	D 1.5	HNu (background) = .8ppm
	6			3	R 1.3	HNu (breathing space) = .4ppm
					6.5	HNu (head space) = .8ppm PGA-SB-008-05/VOC Time: 10:06
	7–10					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT PGA | HOLE NO. PG90-8

Hole No. PG90-8

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 2 OF 10 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): Betw Bldgs 1 + 26
3. DRILLING AGENCY: CEMRO (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-8
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 56.5'
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Split Spoon
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 53.3'
16. DATE HOLE: STARTED 2-16-90 | COMPLETED 2-19-90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Penny C Buckman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	10.0		becomes a fat clay (CH) brown + tan color, sl moist, very plastic, stiff	2 / 6 / 7	10.0 D1.5 R1.5 11.5	N= 13; Rec = 1.5'; HNu (bg) = .8ppm; HNu (bs) = .8ppm; HNu (hs) = 1.2ppm; PGA-SB-008-10/VOC Time: 10:12; PGA-SB-008/TOC Time: 10:12
	11					
	12					
	13					
	14					
	15			5 / 7 / 8	15.0 D1.5 R1.2 16.5	N = 15; Rec = 1.2'; HNu (bg) = .8ppm; HNu (bs) = .8 ppm; HNu (hs) < 1.0ppm; PGA-SB-008-15/VOC Time: 10:20
	15.7		becomes sand (SW), sl. moist, tan color no plasticity, m. dense			
	16					
	17					
	18					
	19					
	20					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT PGA | HOLE NO. PG90-8

Hole No. PG90-8

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 3 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6"CP HSA 5" OD Split Spoon	
2. LOCATION (Coordinates or Station) Betw Bldgs 7 & 26		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-8		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18	UNDISTURBED
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ___ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.3'	
		16. DATE HOLE: STARTED 2-16-90	COMPLETED 2-19-90
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Penn S Brockman	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	20		Sand (SW) as above contains gravel (scarce)	7		N = 26
					D 1.5	Rec = 1.4'
	21			12	R 1.4	HNu (bg) = .8 ppm
				14	21.5	HNu (bs) = 1.2 ppm
						HNu (hs) = 1.8 ppm
	22					PGA-SB-008-20/VOC
						Time: 10:32
	23					PGA-SB-008-QC/VOC
						Time: 10:32
	24					
	25				25.0	
			larger pieces of gravel appears	5	D 1.5	N = 14
						Rec = 1.2'
	26			7	R 1.2	HNu (bg) = .8 ppm
						HNu (bs) = 3.0 ppm
				7	26.5	HNu (hs) = 1.2 ppm
	27					PGA-SB-008-25-VOC
						Time: 10:40
						PGA-SB-008-QA/VOC
	28					Time: 10:40
	29					
	30					

Hole No. PG90-8

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 4 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6.0D HSA 3.0D Split Spoon	
2. LOCATION (Coordinates or Station) Betw Bldgs 7 + 26		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY SEMRO COMAHA		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and file number) PG90-8		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 18 / UNDISTURBED
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.3'	
		16. DATE HOLE	STARTED 2-16-90 / COMPLETED 2-19-90
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR [signature]	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. 30.0 f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			becomes a silty clay (CH) plastic, med. brown color, stiff, sl moist (contains metal flakes) mica	4 / 4 / 6	D1.5 R1.5 31.5	N= 10 Rec = 1.5' HNu (bg) = .8 ppm HNu (bs) = 3.0 ppm HNu (hs) = 3 ppm
	31					
	32					Inside augers HNu read 110 ppm
	33					PGA-SB-008-30/voc Time: 11:45 PGA-SB-008-GC/TOC Time: 11:45
	34					PGA-SB-008-QA/TOC Time: 11:45 PGA-SB-008/TOC Time: 11:45
	35				35.0	
	35.2		becomes sand (SW) with silt, tan color, dense, sl moist, no plasticity, contains pebbles + gravel	8 / 15 / 21	D1.5 R1.5 36.5	N=36 Rec = 1.5 HNu (bg) = .8 ppm HNu (bs) = 3.0 ppm HNu (hs) = .4 ppm
	36					
	37					PGA-SB-008-35/voc Time: 11:55
	38					
	39					
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT)

PROJECT PGA | HOLE NO. PG90-8

Hole No. PG90-8

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 5 OF 6 SHEETS
1. PROJECT Phoenix Goodyear Airport		10. SIZE AND TYPE OF BIT 6" CO ASA 3" OD Split Spoon	
2. LOCATION (Coordinates or Station) Betw Bldgs 1 & 26		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY CEMRO (OMAHA)		12. MANUFACTURER'S DESIGNATION OF DRILL CME75	
4. HOLE NO. (As shown on drawing title and file number) PG90-8		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN	DISTURBED 18 / UNDISTURBED
5. NAME OF DRILLER Al Oaks		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER 53.8'	
		16. DATE HOLE	STARTED 2-16-90 / COMPLETED 2-19-90
7. THICKNESS OF OVERBURDEN 56.5'		17. ELEVATION TOP OF HOLE	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING %	
9. TOTAL DEPTH OF HOLE 56.5'		19. SIGNATURE OF INSPECTOR Penny S Buckman	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40		becomes a gravelly sand (SP) v dense, no plasticity, lt tan color, sl moist	9	40.0	N = 57
					D1.5	Rec = 1.0'
	41			23	R1.0	HNu (bg) = .8 ppm HNu (bs) = 7 ppm
				34	41.5	HNu (hs) = 2 ppm
	42					Inside auger HNu read 30ppm
	43					PGA-SB-008-40/VOC Time: 12:05
	44					
	45				45.0	
				11		N = 21 Rec = 1.0'
	45.5		Fat CLAY (CH) moist, stiff, med brn color plastic		D1.5	HNu (bg) = .8 ppm
	46		Back to sand (SW-SM) tan to med brn, low plasticity, m. dense mica chips present	12	R1.0	HNu (bs) = 2 ppm
				9	46.5	HNu (hs) = 1.0 ppm
	47					Inside auger reads 80ppm
						PGA-SB-008-45/VOC Time: 12:20
	48					
	49					
	50					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT PGA | HOLE NO. PG90-8

Hole No. PG90-8

DRILLING LOG	DIVISION MRD	INSTALLATION Phoenix Goodyear Airport	SHEET 6 OF 6 SHEETS

1. PROJECT: Phoenix Goodyear Airport
2. LOCATION (Coordinates or Station): Betw Bldgs 1 + 26
3. DRILLING AGENCY: CENPD (OMAHA)
4. HOLE NO. (As shown on drawing title and file number): PG90-8
5. NAME OF DRILLER: Al Oaks
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 56.5'
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 56.5'
10. SIZE AND TYPE OF BIT: 6" OD HSA 3" OD Split Spn
11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: CME 75
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18 | UNDISTURBED
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 53.3'
16. DATE HOLE: STARTED 2-16-90 | COMPLETED 2-19-90
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: %
19. SIGNATURE OF INSPECTOR: Penny S Brockman

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Sand (sw-sm) low plasticity med. dense tan to med brown with mica..	8	50.0	N=24
				10	D1.5	Rec= 1.3'
	51			14	R1.3	HNu(bg)= .8 ppm
					51.5	HNu(bs)=205ppm
						HNu(hs)= 1ppm
	52					60ppm in auger
						PGA-SB-008-50/voc Time: 12:30
	53					
	53.3	▼				
	54					
	55		becomes very gravelly (big chunks)	3	55.0	N=35
				13	D1.5	Rec= 1.0'
	56			22	R1.0	HNu(bg)= .8ppm
					56.5	HNu(bs)= 1.2 ppm
						HNu(hs)= 1ppm
	57		BOH @ 56.5'			PGA-SB-008-55/voc Time: 12:53
						40ppm in auger
	58					Water level @ 53.3'
						Installed vapor ports
	59					Barrel Composite for borehole depth not included in sample count
	60					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT PGA HOLE NO. PG90-8

APPENDIX B

INSTALLATION DIAGRAMS

DRILLING LOG

ELEVATION TOP OF HOLE

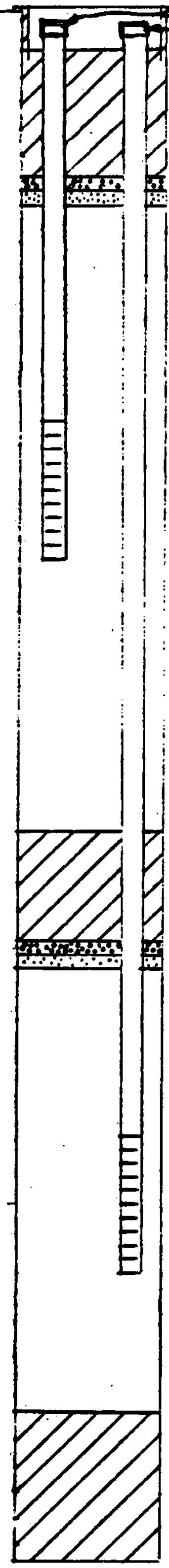
Hole No. PG90-8

PROJECT: Phoenix Goodyear Airport

INSTALLATION: Soil Vapor Monitoring Ports

SHEET ___ OF ___ SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Surface Completion w/ leak resistant aluminum flush mount manhole cover			



0.0'-5.5' Cement

5.5'-6.5' Granular Bentonite

6.5'-8.0' Sand

Riser - 1" Sch 80 PVC, flush joint threaded

Screen 1" Sch 80 PVC 5-foot .060" slot

15'-20' screen interval

8.0'-29.7' Pea Gravel

29.7'-33.0' Cement

33.0'-34.0' Granular ~~Bentonite~~

34.0'-35.0' Sand

40'-45' screen interval

35.0'-48.6' Pea Gravel

53.3'

48.6'-56.5' Cement

1:10 VERTICAL SCALE

ENG FORM 1836-A JUN 67 (ER 1110-1-1801) GPO 1980 OF-620-603

PROJECT: Phoenix Goodyear Airport

HOLE NO. PG90-8

DRILLING LOG

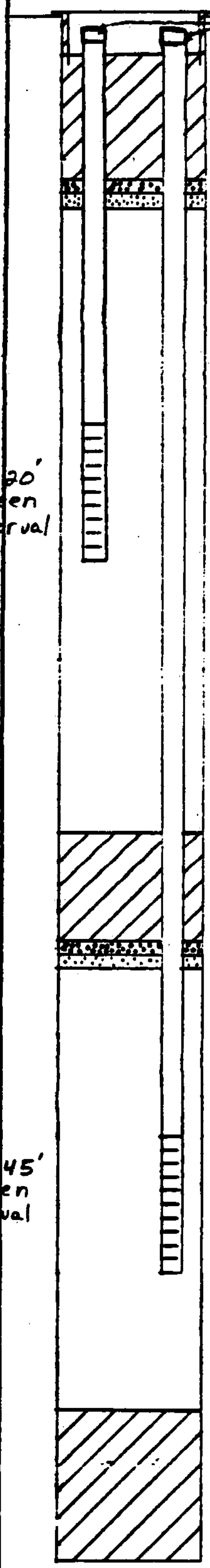
ELEVATION TOP OF HOLE

Hole No. PG90-3

PROJECT	INSTALLATION	SHEET
Phoenix Goodyear Airport	Soil Gas Monitoring Ports	OF SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g

Surface completion w/ leak resistant aluminum manhole cover.



PVC CAP

0 - 5.0 Cement

5.0'-7.0' Granular Bentonite

7.0'-8.0' Sand

Riser - 1" Sch 80 PVC, flush joint threaded.

Screen - 5 foot, 1" Sch 80 PVC .060 slot

15'-20' screen interval

8.0'-29.8' Pea Gravel

29.8'-33.8' Cement

33.8'-34.5' Granular Bentonite

34.5'-35.0' Sand

40'-45' screen interval

35.0'-51.3' Pea Gravel

51.3'-56.5' Cement

No VERTICAL SCALE

ENG FORM 1836-A (ER 1110-1-1801) JUN 67 GPO 1980 OF-620-603

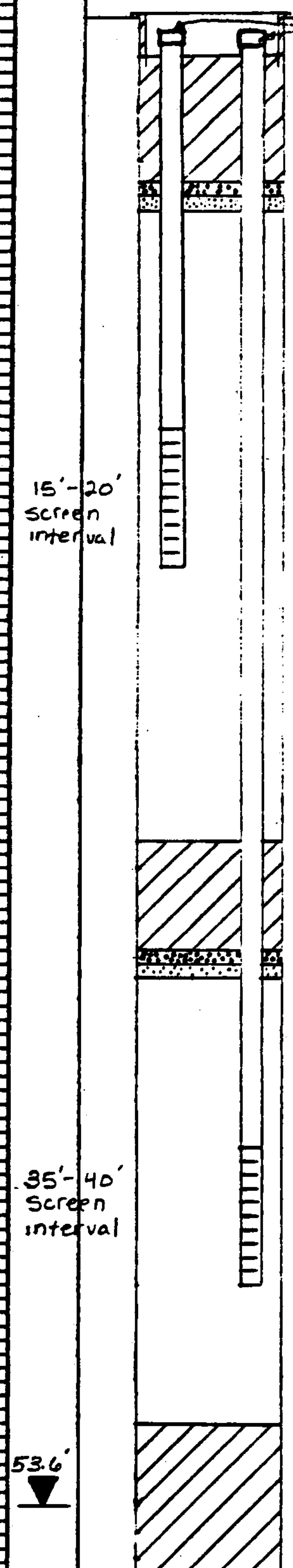
PROJECT: Phoenix Goodyear Airport | HOLE NO. PG90-3

DRILLING LOG | ELEVATION TOP OF HOLE | **Hole No.** PG9C - 4

PROJECT: Phoenix Goodyear Airport | INSTALLATION: Soil Gas Monitoring Ports | SHEET ___ OF ___ SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g

Surface Completion w/ leak resistant aluminum manhole cover.



0. - 7.6' Cement

7.6' - 8.0' Granular Bentonite
8.0' - 8.8' Sand

Riser - 1" Sch 80 PVC, flush joint threaded

Screen - 5 foot, 1" sch 80 PVC .060" slot

8.8' - 29.6' Pea Gravel

29.6' - 32.8' Cement

32.8' - 33.3' Granular ~~Bentonite~~
33.3' - 34.0 Sand

34.0' - 44.3' Pea Gravel

44.3' - 54.7' Cement
54.7 - 54.5 - natural materials (cave)

NO VERTICAL SCALE

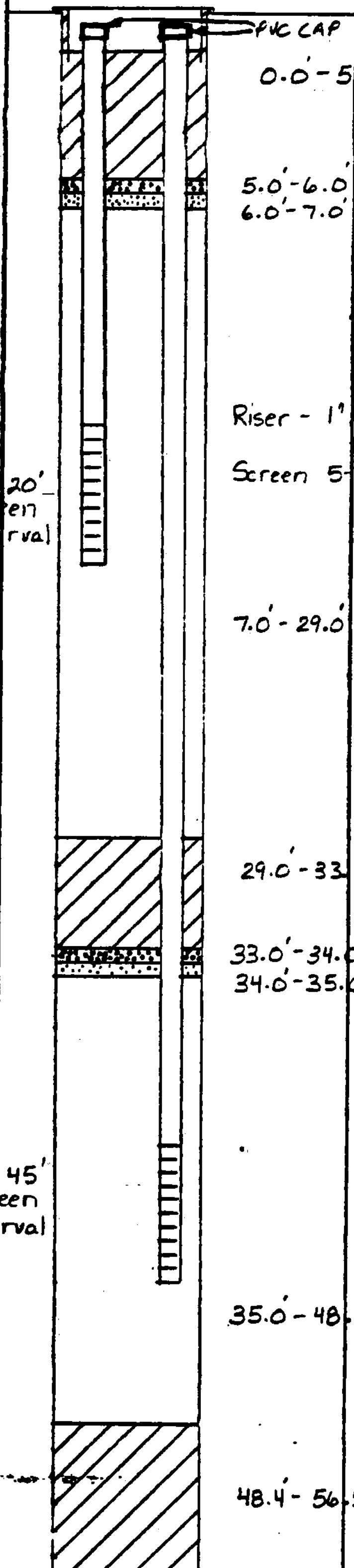
ENG FORM 1836-A (ER 1110-1-1801) JUN 67 GPO 1980 OF-620-603

PROJECT: Phoenix Goodyear Airport | HOLE NO. PG90-4

DRILLING LOG | ELEVATION TOP OF HOLE | **Hole No.** PG90 - 5

PROJECT: Phoenix Goodyear Airport | INSTALLATION: Soil Gas Monitoring Ports | SHEET ___ OF ___ SHEETS

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			Surface Completion w/ leak resistant aluminum manhole cover			
			0.0'-5.0' Concrete			
			5.0'-6.0' Granular Bentonite			
			6.0'-7.0' Sand			
			Riser - 1" Sch 80 PVC, flush joint threaded			
		15'-20' screen interval	Screen 5 foot 1" Sch 80 PVC .060" slot			
			7.0'-29.0' Pea Gravel			
			29.0'-33.0' Cement			
			33.0'-34.0' Granular ~~Bentonite~~			
			34.0'-35.0' Sand			
		40'-45' screen interval				
			35.0'-48.4' Pea Gravel			
		53.6	48.4'-56.5' Cement			



No VERTICAL SCALE

ENG FORM 1836-A (ER 1110-1-1801) GPO 1980 OF-628-003 | PROJECT: Phoenix Goodyear Airport | HOLE NO. PG90-5

APPENDIX C

DAILY REPORTS

Date of Work 2-2-90

DAILY EXPLORAT ONS REPOR

Ch.

LABOR

SHIFT NO. 1

EMPLOYEE	HOURS	RATE	AMOUNT
P Brockman	8		
A Oaks	8		
K Thomas	8		

Direct Labor
Indirect Overhead ____ %
Per Diem No. ____ X ____
Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE27845	PANEL TRAILER			
CE25815	STAKE			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
TOTAL MATERIALS	

Hole No.
Location
Land Owner
Type of Drill
Drilled: from
to
Footage
Casing Set
Casing Pulled
Casing Lost
Hours Drilling
Hours Moving
Hours Shut Down
No. of Samples ____ Type ____

Project DAVIS MONTAN DROSS PILES (2hrs) Phoenix-Goodyear Project (6hrs)
Cost Code RG000105258O150
QE020005858O102
Request No. M-295,

Total Labor
Total Materials
Total Equipment
Total Cost

WEATHER and GROUND CONDITIONS: SNOWY, COLD (Tucson), Sunny, cool (50's) (Phoenix)

Remarks: Returned to Davis-Monthan for grab samples from Site 34 a,b (2 each); after this we packed + started for Phoenix; arrived + found hotel by 2:30 PM. Went to city offices in Goodyear + got the "nod" for water on site. They will bill us for all charges at one time to make the paperwork easier. If we run into any problems w/accessing the water, we're to call Debbie (Goodyear City Water) - 932-3910

Signature: Penny S Brockman

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2/4/89

LABOR			SHIFT NO.
EMPLOYEE	HOURS	RATE	AMOUNT
MORRISSEY, J.	4		
O.T.			
PEARSON, S.	4		
O.T.			

Direct Labor
Indirect Overhead ______ %
Per Diem No. ______ X
Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
TOTAL MATERIALS	

Hole No. PG90-9, 10, 11
Location
Land Owner
Type of Drill
Drilled: from
to
Footage
Casing Set
Casing Pulled
Casing Lost
Hours Drilling
Hours Moving
Hours Shut Down
No. of Samples 6 Type chemical

Project Phoenix Goodyear Airport
Cost Code ~~QE~~ 0200058580102
Request No.

Total Labor
Total Materials
Total Equipment
Total Cost

WEATHER and GROUND CONDITIONS: Sunny, 68°F, winds 5-10 mph

Remarks: unpacked equipment; steam clean sampling equipment; sample drainage ditch at locations PG90-9, 10, 11 and southwest of treatment plant. Composite samples from 3 locations in ditch into 1 8oz jar at each of the 3 locations -9, 10, 11. Decon equipment. Pack samples. Complete chain of custody form.

Level D with latex gloves, rubber boots.

Signature: S. Pearson

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2/5/90

LABOR

SHIFT NO. ______

EMPLOYEE	HOURS	RATE	AMOUNT
J. MORRISSEY	8		
A. OAKS	8		
K. THOMAS	8		
P. BROCKMAN	8		
S. PEARSON	8		

Direct Labor
Indirect Overhead ______ %
Per Diem No. ______ X ______
Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE21064	CME-75			
CE40161	Pickup			
CE17667	Stake			
CE21135	Trailer			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
Cement, PVC tremie pipe, granular bentonite, pvc valve.	
DACW45-90-M-U-	

TOTAL MATERIALS

Hole No. ______
Location ______
Land Owner ______
Type of Drill ______
Drilled: from ______
to ______
Footage ______
Casing Set ______
Casing Pulled ______
Casing Lost ______
Hours Drilling ______
Hours Moving ______
Hours Shut Down ______
No. of Samples ______ Type ______

Project Phoenix Goodyear Airport
Cost Code QE0200058580102
Request No. ______

Total Labor ______
Total Materials ______
Total Equipment ______
Total Cost ______

WEATHER and GROUND CONDITIONS: Sunny 68°F

Remarks: Conduct Site Safety Briefing. Call Office, talk to Ann Wright, M. Tipler. Pickup HNu at Area Office & Access Agreement. Pick up drillers card at ADWR. Fix transmission on drill rig truck. Call Tom Heim & Randy Clark. Meet w/ Randy Clark. Layout borings. Pick up supplies. Ship metal samples to MRD Lab.

Signature: S. Pearson

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2/6/90

LABOR

SHIFT NO. ______

EMPLOYEE	HOURS	RATE	AMOUNT
J. MORRISSEY	8		
A. OAKS	8		
K. THOMAS	8		
P. BROCKMAN	8		
S. PEARSON	8		

Direct Labor
Indirect Overhead ______ %
Per Diem No. ______ X ______
Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE21064	CME-75			
CE40161	Pick up			
CE17667	Stake			
CE21135	Trailer			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
Hearing Protection, Brecon	
DACW45-90-M-4-401	
TOTAL MATERIALS	

Hole No. ______
Location ______
Land Owner ______
Type of Drill ______
Drilled: from ______
to ______
Footage ______
Casing Set ______
Casing Pulled ______
Casing Lost ______
Hours Drilling ______
Hours Moving ______
Hours Shut Down ______
No. of Samples ______ Type ______

Project Phoenix Goodyear Airport
Cost Code QE020005858010 2
Request No. ______

Total Labor ______
Total Materials ______
Total Equipment ______
Total Cost ______

WEATHER and GROUND CONDITIONS: Sunny 70°F

Remarks: Call office. Calibrate HNu; Instrument not working properly. Call On-Site Instruments, arrange for new HNu to be sent to Phoenix. Make calls to arrange for supplies. Pull vehicles onto Loral site. Make contact w/ airport about cuttings storage. Pick up hose at Public Works Dept. Stop at Samaritan West Valley Emergency to notify them of our work & ck on their services. Pick up distilled water. Unload Stake truck. Steam clean rig, augers, drill rods. Pick up ear plugs at WW Grainger. Ship defective HNu out. Pick up pvc pipe, manhole covers, screens etc.

Signature: S. Pearson

DAILY EXPLORATIONS REPORT

~~Date~~ of Work 7 Feb. 89

SHIFT NO. 1

LABOR

EMPLOYEE	HOURS	RATE	AMOUNT
A. Oaks	8		
J Morrissey	8		
K Thomas	8		
P Brockman	8		
S Pearson	8		
A Oaks	1		
J Morrissey	1		
K Thomas	1		
P Brockman	1		
S Pearson	1		

Direct Labor

Indirect Overhead ______ %

Per Diem No. ______ X ______

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE40161	Panel			
CE20695	Trailer			
CE21064	CME75			
CE25815	Stake			
PTTST4	(Rental)			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
3" valve	
1¼" ball valve	
2" x 4" Nipple	
1¼" x 3" "	
1¼" Stop Cock w/Hose Bib	
P ~~PVC Pipe + wel covers~~	

TOTAL MATERIALS

Hole No.

Location

Land Owner

Type of Drill

Drilled: from

to

Footage

Casing Set

Casing Pulled

Casing Lost

Hours Drilling

Hours Moving

Hours Shut Down

No. of Samples ______ Type ______

Project Phoenix Goodyear Project

Cost Code QE 020005858O102

Request No. —

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: ~~[illegible]~~ Warm, clear, sunny (70°)

Remarks: Steam cleaned augers again first thing after arriving on site – Steve went to Phoenix to pick up HNu + auger bit. Went to boring location 2 + set up rig, decon, exclusion zone, etc. Got split spoons ready + wrapped w/foil. Goodyear blimp flew by twice overhead (spying?) Drilled (cored) thru concrete (approx .455'). Had a hard time locating pea gravel, sand, stock tank – will pick up finally, tomorrow! Also drums.

Signature: Penny S Brockman

CW

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2-8-90

LABOR			SHIFT NO. 1
EMPLOYEE	HOURS	RATE	AMOUNT
A Oaks	8		
J Morrissey	8		
K Thomas	8		
P Brockman	8		
S Pearson	8		
A Oaks	2		
J Morrissey	2		
K Thomas	2		
P Brockman	2		
S Pearson	2		

Direct Labor

Indirect Overhead ______ %

Per Diem No. ______ X ______

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE40161	Panel			
CE20695	Trailer			
CE21064	CME75			
CE25815	Stake			
~~FT514~~	~~Rental~~			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
2X2X4 Stock Tank	
17-H Drums	
3/8" Pea Gravel	

TOTAL MATERIALS

Hole No. PG 90-2

Location

Land Owner

Type of Drill CME75

Drilled: from 0' to 56.5'

Footage 56.5'

Casing Set —

Casing Pulled —

Casing Lost —

Hours Drilling 6

Hours Moving —

Hours Shut Down —

No. of Samples 12 Type Grab
4 Composite

Project Phoenix Goodyear Airport

Cost Code QE020005B580102

Request No. —

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: Cool, overcast,

Remarks: Al + Kirk went after drums + stock tank; Joe, Steve + I went to get pea gravel + to set up decon for work day. We started to drill/sample at 10:00 but HNu started to show a low battery. We plugged it in for recharge. Al + Kirk were delayed in picking up the drums because yard man at pickup site was gone. We started drilling w/all personnel @ 1:00. Finished hole at 5:30 + Steve + I rushed to Fed Ex to ship samples while the drill crew cleaned up.

Signature: Penny S. Brockman

DAILY EXPLORATIONS REPORT

Date of Work 2/9/89

LABOR

SHIFT NO.

EMPLOYEE	HOURS	RATE	AMOUNT
MORRISSEY, J	8		
	2 OT		
OAKS, A.	8		
	2 OT		
THOMAS, K	8		
	2 OT		
BROCKMAN, P	8		
	2 OT		
PEARSON	8		
	2 OT		

Direct Labor

Indirect Overhead ________ %

Per Diem No. ______ X ______

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE 21064	CME-75			
CE 17667	Stake			
CE40161	Panel			
	Trailer			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT

TOTAL MATERIALS

Hole No. PG90-3

Location West side of Bldg 16

Land Owner Loral Defense Systems

Type of Drill CME-75

Drilled: from 0.0

to 56.5

Footage 56.5

Casing Set

Casing Pulled

Casing Lost

Hours Drilling 10

Hours Moving

Hours Shut Down

No. of Samples 11 Type VOC

3" Stainless Steel splitspoon 2 TOC

Project Phoenix Goodyear Airport

Cost Code

Request No.

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: Sunny 75°F

Remarks: Setup and grout boring PG90-2. Clean-up and move off boring. Steam clean augers, rods, rig and tools. Pickup equipment at hardware store. Pull rig under water tower and set up on boring PG90-3 between fence and building 16. Set up rig, exclusion zone, etc. Set up to core. Core 8" of concrete. Set up to auger. Sample and auger from 0 to 56.5 feet; Pack and deliver samples to Federal Express. Secure site.

Signature: A. Pearson

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2-12-90

ChW

LABOR

SHIFT NO. ______

EMPLOYEE	HOURS	RATE	AMOUNT
Al Oaks	8		
Joe Morrissey	8		
Kirk Thomas	8		
Penny Brockman	8		
~~Joe~~			
? ~~John Sartore~~	~~8~~		

Direct Labor

Indirect Overhead ______ %

Per Diem No. ______ X ______

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE40161	Panel			
CE20695	Trailer			
CE21014	CME75			
CE25815	Stake			
FT514	Rental			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
HARDWARE	
DACW45-90-M-4-244	

TOTAL MATERIALS

Hole No. PG90-3

Location West of Bldg. 16

Land Owner Local

Type of Drill CME75

Drilled: from —— to ——

Footage did not drill

Casing Set (ports) 65' = (20,45)

Casing Pulled ——

Casing Lost ——

Hours Drilling ——

Hours Moving ——

Hours Shut Down ——

No. of Samples —— Type ——

Project Phoenix Goodyear Airport

Cost Code QE02000 58580102

Request No. ——

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: overcast, warm, calm (75+°)

Remarks: Left hotel at 7:30; Chemist went to get peanuts, Crew went to get calcium chloride admixture for concrete plugs for soil gas ports. Arrived on site & steam cleaned pre for installation; briefed Chemist on Safety Procedures, 40-hr training requirement, & SHERP. Started on installing ports ≈ 9:00 or 9:30. Completed installation at 4:00. Process was slow - but it was completed perfectly. Next one should go faster now that we know what we're doing. Tomorrow we will do PG90-5 (drill/sample)

Signature: Penny S Brockman

Date of Work 2-13-90

DAILY EXPLORATIONS REPORT

CLN

LABOR

SHIFT NO. 1

EMPLOYEE	HOURS	RATE	AMOUNT
Al Oaks	8		
Joe Morrissey	8		
Kirk Thomas	8		
Penny Brockman	8		
John Sartore			

Direct Labor

Indirect Overhead ______ %

Per Diem No. ______ X ______

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE40161	Panel			
CE20695	Trailer			
CE21064	CME75			
BE25815	Stake			
FTTS14	Rental			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT

TOTAL MATERIALS

Hole No. PG90-4

Location SW Corner of Bldg 1

Land Owner Loral

Type of Drill CME75

Drilled: from 0'

to 56.5'

Footage 56.5'

Casing Set —

Casing Pulled —

Casing Lost —

Hours Drilling 8

Hours Moving —

Hours Shut Down —

No. of Samples 14 Type VOC

5 TOC

Project Phoenix Goodyear Project

Cost Code QE0200058580102

Request No. —

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: Ptly cloudy, 60's

Remarks: Had some high hits with HNu immediately at borehole from 40' – bottom – ranged from 700ppm to 200 ppm. Backed off and aerated borehole before continuing in each case. Finished sampling – will put in vapor ports tomorrow

Signature: Penny S Brockman

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

Date of Work 2-14-90

DAILY EXPLORATIONS REPORT

CLW

LABOR

SHIFT NO. ______

EMPLOYEE	HOURS	RATE	AMOUNT
Al Oaks	8		
J. Morrissey	8		
Kirk Thomas	8		
Penny Brockman	8		
A Oaks	2		
J Morrissey	2		
K Thomas	2		
P Brockman	2		

Direct Labor

Indirect Overhead ______ %

Per Diem No. ______ X ______

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE40161	Panel			
CE20695	Trailer			—
CE21064	CME75			
CE25815	Stake			
FTT514	Rental			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
3/8" Pea gravel (1.5T)	

TOTAL MATERIALS

Hole No. PG90-~~3~~ 4

Location SW corner of Bldg 1

Land Owner Loral

Type of Drill CME75

Drilled: from 0

to 0

Footage 0

Casing Set —

Casing Pulled (Augers pulled 55'

Casing Lost

Hours Drilling 8

Hours Moving

Hours Shut Down

No. of Samples ______ Type ______

Project Phoenix Goodyear Project

Cost Code QE0200058580102

Request No. —

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: cool, ptly cloudy (50's)

Remarks: Talked to Randy Clark (Loral contact) about borrowing a fork lift to put drums on water truck for transporting to Airport. Installed Soil vapor port in PG90-4. Had some problems (minor) with the tremie operations but got them solved. Because of problems, the deep port's screen is set from 35'-40' instead of 40'-45'. It's the same zone so it should not be a problem. (Cored thru concrete on PG90-5 before leaving site today.)

Signature: Penny S Brockman

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2-15-90

CLN

LABOR SHIFT NO. 1

EMPLOYEE	HOURS	RATE	AMOUNT
A Oaks	8		
J Morrissey	8		
K Thomas	8		
P Brockman	8		
A Oaks	2		
J Morrissey	2		
K Thomas	2		
P Brockman	2		

Direct Labor

Indirect Overhead ______ %

Per Diem No. ______ X

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE40161	Panel			
CE20695	Trailer			
CE21064	CME75			
CE25815	Stake			
FTT5K1	Rental			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
Portland Cement	
Hand pump	
1" PVC Pipe caps	
Glass Cleaner	
HAND Cleaner	
ARMORALL	

TOTAL MATERIALS

Hole No. PG90-5

Location NW Corner of Bldg 1

Land Owner Loral

Type of Drill CME75

Drilled: from 0

to 56.5

Footage 56.5

Casing Set 65' (Ports)

Casing Pulled —

Casing Lost —

Hours Drilling 13

Hours Moving —

Hours Shut Down —

No. of Samples 18 Type D

Project Phoenix Goodyear Airport

Cost Code QE0200058580102

Request No. —

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: cool (50's) breezy, partly cloudy

Remarks: Drilled/Sampled and installed Soil Vapor Ports in PG90-5. Site Visitor Joe Sartore flying out Friday. (No problems today) Randy Clark came by with a name & number for Howard Kaiser (new contact). Joe Morissey also leaving on Friday

Signature: Penny S. Brockman

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2-16-90

ChW

LABOR

SHIFT NO. 1

EMPLOYEE	HOURS	RATE	AMOUNT
A Oaks	8		
J Morrissey	8		
K Thomas	8		
P Brockman	8		
A Oaks	4		
J Morrissey	2		
K Thomas	4		
P Brockman	4		

Direct Labor
Indirect Overhead ______ %
Per Diem No. ______ X
Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE40161	Panel			
CE20695	Trailer			—
CE21064	CME75			
CE25815	Stake			
FTT5M	Rental			

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT

TOTAL MATERIALS

Hole No. PG-90-8
Location
Land Owner Loral
Type of Drill CME75
Drilled: from 0
to 56.5'
Footage 56.5'
Casing Set 45' (Ports)
Casing Pulled —
Casing Lost
Hours Drilling 8
Hours Moving —
Hours Shut Down —
No. of Samples 18 Type D

Project Phoenix Goodyear Airport
Cost Code QE0200058580102
Request No. —

Total Labor
Total Materials
Total Equipment
Total Cost

WEATHER and GROUND CONDITIONS: cool, clear, 50's

Remarks: Drilled/sampled + partially installed soil vapor ports (45' depth installed) in PG-90-8. Ran into some problems when installing port that led to an additional 2hrs work time for Al, Kirk + I. Joe Morrissey + site visitor John Sartore left at 5:30 for airport. After hitting water we drilled an additional 6' to accommode sampling w/Hydro punch. Encountered very hard drilling conditions — ~~big~~ gravel (coarse) — decided to scrap water sampling rather than damage Hydropunch

Signature: Penny S Brockman

DAILY EXPLORATIONS REPORT

Date of Work 2-19-90 Holiday

CLW

LABOR

SHIFT NO. 1

EMPLOYEE	HOURS	RATE	AMOUNT
A Oaks	8		
" " (H)	~~8~~		
Kirk Thomas	8		
" " (H)	~~8~~		
Penny Brockman	8		
" " (H)	~~8~~		
Tom Liefer	8		
" " (H)	~~8~~		
Holiday Pay			

Direct Labor

Indirect Overhead ______ %

Per Diem No. ____ X ____

Total Labor

Hole No.	PG90-7
Location	
Land Owner	Loral
Type of Drill	CME75
Drilled: from	0'
to	45'
Footage	45'
Casing Set	—
Casing Pulled	—
Casing Lost	—
Hours Drilling	6
Hours Moving	—
Hours Shut Down	2 CW
No. of Samples	16 Type D

Project Phoenix Goodyear Airport

Cost Code QE020005358O102

Request No. —

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: windy, prtly cldy, cool (50's)

Remarks: Liefer flew in to help. Drilled/sampled PG90-7 to 45'. Will finish drilling & grout tomorrow. Slower progress w/just 4 people instead of 5. Bent drill stem again - took back to be repaired in Tolleson (Tolleson Steel). Liefer to fly on to Edwards tomorrow.

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE25315	Stake			
CE21064	CME75			
CE40161	Panel			
CE20695	Trailer			—

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
machine work on drill stem	

TOTAL MATERIALS

Signature: Penny S Brockman

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2-20-90

CLN

LABOR SHIFT NO. 1

EMPLOYEE	HOURS	RATE	AMOUNT
A. Oaks	8		
K. Thomas	8		
P. Brockman	8		

Direct Labor

Indirect Overhead ________ %

Per Diem No. ______ X ______

Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE25815	Stake			
CE21064	CME75			
CE40161	Panel			
CE30695	Trailer			—

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT

TOTAL MATERIALS

Hole No. PG90-7

Location E of Bldg 6

Land Owner Local

Type of Drill CME75

Drilled: from 45'

to 56.5'

Footage 11.5'

Casing Set —

Casing Pulled —

Casing Lost —

Hours Drilling 1.5 hrs + (6.5 working)

Hours Moving —

Hours Shut Down —

No. of Samples 2 Type D

Project Phoenix Goodyear Airport

Cost Code QE02000538530102

Request No. —

Total Labor

Total Materials

Total Equipment

Total Cost

WEATHER and GROUND CONDITIONS: sunny, clear, 60's

Remarks: Finished PG90-7, grouted - picked up all drums & took to airport. Spray painted boring # on each drum of cuttings. Didn't take lunch break today - in middle of mixing grout w/rig. Finish steam cleaning, cleaning & packing trailer, & cleaning up area. Plan to leave tomorrow by noon (Will return fine hose)

Signature: Penny S Brockman

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

DAILY EXPLORATIONS REPORT

Date of Work 2-21-90 CLW

LABOR SHIFT NO. 1

EMPLOYEE	HOURS	RATE	AMOUNT
A Oaks	8		
K Thomas	8		
P Brockman	8		

Direct Labor
Indirect Overhead ______ %
Per Diem No. ______ X ______
Total Labor

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
CE25815	STAKE			
CE21064	CME75			
CE40161	PANEL			
CE20695	TRAILER			—

TOTAL EQUIPMENT
*INDICATE DIESEL OR GASOLINE

MATERIALS

ITEM	AMOUNT
TOTAL MATERIALS	

Hole No. PG 90-7
Location E of Bldg 6
Land Owner Loral
Type of Drill CME75
Drilled: from ______
to ______
Footage ______
Casing Set ______
Casing Pulled ______
Casing Lost ______
Hours ~~Drilling~~ Working 8
Hours Moving ______
Hours Shut Down ______
No. of Samples ______ Type ______

Project Phoenix Goodyear Airport
Cost Code QE0200058580102
Request No. —

Total Labor ______
Total Materials ______
Total Equipment ______
Total Cost ______

WEATHER and GROUND CONDITIONS: Clear, warm, (60's)

Remarks: Evened out the surface of PG90-7 w/grout.
Took Randy Clark on tour of boring locations for verbal agreement on sites (each one) conditions (no damage, debris etc.) – he okayed all. Cleaned site that we stored trailer + equipment at, and steam cleaned rig + water truck (equipment used too) before leaving Loral, Picked up span gas from Corps office down town. Left Phoenix @ 1:00PM. 7:00 - 1:00 Phoenix Project
1:00 - 4:30 Edwards AFB Project

Signature: Perry S. Brockman

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

APPENDIX D

CHAIN OF CUSTODY FORMS

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* S. Pearson, P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals						REMARKS
34A	2/2/90			X	Site 34A/Davis Monthan	2							4oz jars ; hold for analysis; soil
34B	2/2/90			X	Site 34B/Davis Monthan	2							4oz jars ; hold for analysis; soil
PG90-11	2/4/90	1425	X		PGA-SS-011	1	X						8oz jar ; soil
PG90-10	2/4/90	1455	X		PGA-SS-010	1	X						8oz jar ; soil
PG90-10	2/4/90	1455	X		PGA-SS-010-QA	1	X						8oz jar ; split ; soil
PG90-10	2/4/90	1455	X		PGA-SS-010-QC	1	X						8oz jar ; duplicate ; soil
	2/4/90	1512		X	SW of Treatment Plant	1							8oz jar ; smelter ash ('dross') hold for analysis
PG90-9	2/4/90	1525	X		PGA-SS-009	1	X						8oz jar ; soil

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Steven S. Pearson	2/5/90 1653	Joel Wiatt 2/5/90 @ 1653 Fed EXP. LUFA			

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		Carol L Spencer	2-6-90 11:00	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* Steve Pearson P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG90-2	2/8/90	1055		X	PGA-SB-002-05	2	X						2-4oz jars; soil
PG90-2	2/8/90	1315		X	PGA-SB-002-10	2	X						2-4oz jars; soil
PG90-2	2/8/90	1340		X	PGA-SB-002-15	2	X						2-4oz jars; soil
PG90-2	2/8/90	1400		X	PGA-SB-002-20	2	X						2-4oz jars; soil
PG90-2	2/8/90	1400	X		PGA-SB-002-20/TOC	1		X					1-8oz jar; soil
PG90-2	2/8/90	1415		X	PGA-SB-002-25	2	X						2-4oz jars; soil
PG90-2	2/8/90	1445		X	PGA-SB-002-30	2	X						2-4oz jars; soil
PG90-2	2/8/90	1500		X	PGA-SB-002-35	2	X						2-4oz jars; soil
PG90-2	2/8/90	1525		X	PGA-SB-002-40	2	X						2-4oz jars; soil
PG90-2	2/8/90	1600		X	PGA-SB-002-45	2	X						2-4oz jars; soil
PG90-2	2/8/90	1600	X		PGA-SB-002-45/TOC	1		X					1-8oz jar; soil
PG90-2	2/8/90	1600	X		PGA-SB-002-45/TOC-QA	1		X					1-8oz jar; soil; split
PG90-2	2/8/90	1600	X		PGA-SB-002-45/TOC-QC	1		X					1-8oz jar; soil; duplicate
PG90-2	2/8/90	1645		X	PGA-SB-002-50	2	X						2-4oz jar; soil
PG90-2	2/8/90	1725		X	PGA-SB-002-55	2	X						2-4oz jars; soil

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Steven A Pearson	2/8/90 1811	→ FED EXP. refused to sign			
Relinquished by: *(Signature)*	**Date / Time**	**Received by: *(Signature)***	**Relinquished by: *(Signature)***	**Date / Time**	**Received by: *(Signature)***

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		Conrad L Hansen	2-9-90 10:30	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U.. .MY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* Steve Pearson P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC						REMARKS
PG90-2	2/8/90	1725		X	PGA-SB-002-55/QA	2	X						2-4oz jars; soil; ~~duplicate~~ split
PG90-2	2/8/90	1055-1725	X		PGA-SB-002/Drum	1							1-8oz jar; soil; hold for analysis

NOTE: No QC taken for VOC; inadequate sample volume.

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Steven Pearson	2/8/90 1811	+ FED. EXP. Refused to sign			
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[illegible signature]	2-9-90 1030	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: PGA
PROJECT NAME: Phoenix Goodyear Airport

SAMPLERS: (Signature) A. Pearson P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG90-3	2/9/90	1510		X	PGA-SB-003-05	2	X						2-4oz jars; soil; fieldscreen .6ppm
PG90-3	2/9/90	1520		X	PGA-SB-003-10	2	X						2-4oz jars; soil; fieldscreen 1.6ppm
PG90-3	2/9/90	1530		X	PGA-SB-003-15	2	X						2-4oz jars; soil; fieldscreen .4ppm
PG90-3	2/9/90	1545		X	PGA-SB-003-20	2	X						2-4oz jars; soil; fieldscreen 2.3ppm
PG90-3	2/9/90	1545		X	PGA-SB-003-20/QC	2	X						2-4oz jars; soil; duplicate
PG90-3	2/9/90	1520	X		PGA-SB-003-10/TOC	1		X					1-8oz jar; soil;
PG90-3	2/9/90	1555		X	PGA-SB-003-25	2	X						2-4oz jars; soil; fieldscreen 2.5ppm
PG90-3	2/9/90	1555		X	PGA-SB-003-25/QA	2	X						2-4oz jars; soil; split
PG90-3	2/9/90	1625		X	PGA-SB-003-30	2	X						2-4oz jars; soil; fieldscreen 3.2ppm
PG90-3	2/9/90	1640		X	PGA-SB-003-35	2	X						2-4oz jars; soil; fieldscreen 1.2ppm
PG90-3	2/9/90	1625	X		PGA-SB-003-30/TOC	1		X					1-8oz jar; soil
PG90-3	2/9/90	1625	X		PGA-SB-003-30/TOC-QC	1		X					1-8oz jar; soil;
PG90-3	2/9/90	1625	X		PGA-SB-003-30/TOC-QA	1		X					1-8oz jar; soil
PG90-3	2/9/90	1655		X	PGA-SB-003-40	2	X						2-4oz jars; soil; fieldscreen 1.2ppm
PG90-3	2/9/90	1715		X	PGA-SB-003-45	2	X						2-4oz jars; soil; fieldscreen .2ppm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
A. Pearson	2/9/90 1825				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Conrad [illegible]	2-10-90 1000		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* [signature] Pearson; P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC						REMARKS
PG90-3	2/9/90	1730		X	PGA-SB-003-50	2	X						2-4oz jars; soil; fieldscreen 1.1 ppm
PG90-3	2/9/90	1755		X	PGA-SB-003-55	2	X						2-4oz jars; soil; fieldscreen 1.2 ppm
PG90-3	2/9/90	1510-1755	X		Drum Composite	1							1-8oz jar; soil; hold for analysis

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
[signature] Pearson	2/19/90 1825				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[signature]	2-10-90 1000	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U. .MY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: PGA

PROJECT NAME: Phoenix Goodyear Airport

SAMPLERS: (Signature) P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PGA-4	2-13-90	10:32		X	PGA-SB-004-05/VOC	2X	X						2-4oz jars; soil, fieldscreen 13ppm
		10:50		X	PGA-SB-004-10/VOC	2X	X						" " " " " 30ppm
		10:50	X		PGA-SB-004-1 TOC	1X		X					1-8oz jar; soil, fieldscreen 30ppm
		11:00		X	PGA-SB-004-15/VOC	2X	X						2-4oz jars; soil, fs = 45ppm
		11:14		X	PGA-SB-004-20/VOC	2X	X						" " " " " = 55ppm
		11:14		X	PGA-SB-004-QC/VOC	2X	X						" " " " " = 55ppm
		11:31		X	PGA-SB-004-25/VOC	2X	X						" " " " " = 70ppm
		11:31		X	PGA-SB-004-QA/VOC	2X	X						" " " " " = 70ppm
		12:53		X	PGA-SB-004-30/VOC	2X	X						" " " " " = 80ppm
		12:53	X		PGA-SB-004/TOC	1X		X					1-8oz jar, soil fs = 80ppm
		12:53	X		PGA-SB-004-QA/TOC	1X		X					" " " " " = 80ppm
		12:53	X		PGA-SB-004-QC/TOC	1X		X					" " " " " = 80ppm
		13:10		X	PGA-SB-004-35/VOC	2X	X						2, 4oz jars, soil fs = 4.0ppm
		13:52		X	PGA-SB-004-40/VOC	2X	X						" " " " " = 20ppm
↓	↓	14:20		X	PGA-SB-004-45/VOC	2X	X						" " " " " = 4.0ppm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Perry Brockman					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		Carol L. [illegible]	2-14-90 1000	Not cold - cool

Distribution: Original Accompanies Shipment; Copy to Coordin... Field Files

ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	VOC	TOC					REMARKS
RCSC-4	2-13-90	~~[illegible]~~ 1450		X	~~[illegible]~~ PGA-SA-004-54/VOC	2X	X						2-4 oz jars, soil, field screen = 11 ppm
		1512		X	PGA-SB-004-55/VOC	2X	X						" " " " " = 2 ppm
		"	X		PGA-SB-004 0-55'								
					TOC	1X		X					1-8 oz jar soil ~~[illegible]~~

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Penny Brockman					

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[signature]	2-14-90 1000	Not Cold — cool

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

2400

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* P. Brackman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC	REMARKS
PGA-8	2-16-90	[illegible]		X	PGA SB-008-05/VOC	2X	X		2-4oz jar, soil, field scr: .3ppm
↓	↓	10:12		X	PGA SB-008-10/VOC	2X	X		″ ″ ″ ″ =1.2ppm
		″	X		PGA-SB-008/TOC	1X		X	1-8oz jar soil, fld scr =1.2ppm
		10:23		X	PGA-SB-008-15/VOC	2X	X		2-4oz jar, soil, field scr = 1.0ppm
		10:32		X	PGA-SB-008-20-VOC	2X	X		″ ″ ″ ″ ″ =1.8ppm
		″		X	PGA-SB-008-QC/VOC	2X	X		″ ″ ″ ″ ″ =1.6ppm
		10:40		X	PGA-SB-008-25/VOC	2X	X		″ ″ ″ ″ ″ = 1.2ppm
		″		X	PGA SB-008 QA/VOC	2X	X		″ ″ ″ ″ ″ = 1.2ppm
		11:45		X	PGA-SB-008-30/VOC	2X	X		″ ″ ″ ″ ″ = 3.0ppm
		″	X		PGA-SB-008/TOC	1X		X	1-8oz jar-soil, field scr=3.0ppm
		″	X		PGA SB-008-QA/TOC	1X		X	″ ″ ″ ″ ″ ″ =3.0ppm
		″	X		PGA SB-008-QC/TOC	1X		X	″ ″ ″ ″ ″ ″ =3.0ppm
		11:55		X	PGA-SB-008-35/VOC	2X	X		2-4oz jar-soil, fld scr = .4ppm
		12:05		X	PGA-SB-008-40/VOC	2X	X		″ ″ ″ ″ ″ =2.0ppm
↓	↓	12:20		X	PGA-SB-008-45/VOC	2X	X		″ ″ ″ ″ ″ =1.0ppm

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
P Brackman	2-16-90 3:00 pm				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	
		Brad Bret	2/17/90 1200		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U. [illegible]RMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: [illegible]

PROJECT NAME: Phoenix Goodyear Airport

SAMPLERS: (Signature) P. Buckmann

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
[illegible]	2-16-90	12:37		X	PEA-SB-003-~~55~~ 50/VOC	2X	X						2-4oz jar, soil, fieldscr = 1.0ppm
↓	↓	12:53		X	PEA-SB-003-55/VOC	2X	X						" " " " = 1.0ppm
		1:00	X		Barrel Composite (Bethel	1X		X					1-8oz jar soil

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
P. Buckmann	2-16-90 / 3:00 PM				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		Brad Bird	2/17/90 / 1200	

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U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PG-A	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* P. Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG-90-5	2-15-90	9:15		X	PGA-SB-005-05/VOC	2X	X						2-4oz jars, soil, field screen = 1.2 ppm
		9:23		X	PGA-SB-005-10/VOC	2X	X						" " " " " = .4 ppm
		"	X		PGA-SB-005/TOC	1X		X					1-8oz jar " " "
		9:30		X	PGA-SB-005-15/VOC	2X	X						2-4oz jars, soil, field scn = 12 ppm
		9:45		X	PGA-SB-005-20/VOC	2X	X						" " " " " 5ppm
		"		X	PGA-SB-005-QC/VOC	2X	X						" " " " " 5ppm
		9:57		X	PGA-SB-005-QA/VOC	2X	X						2-4oz jar, soil, field scrn = 18ppm
				X	PGA-SB-005-25/VOC	2X	X						" " " " " 18ppm
		10:15		X	PGA-SB-005-30/VOC	2X	X						" " " " " = 4ppm
		"	X		PGA-SB-005/TOC	1X	~~X~~	X					1-8 oz jar soil, field sc = 4ppm
		"	X		PGA-SB-005-QA/TOC	1X		X					" " " " "
		"	X		PGA-SB-005-QC/TOC	1X		X					" " " " " "
		10:52		X	PGA-SB-005-35/VOC	2X	X						2-4oz jars, soil, field scr = 2ppm
		11:03		X	PGA-SB-005-40/VOC	2X	X						" " " " " = 2.5 ppm
		11:18		X	PGA-SB-005-45/VOC	2X	X						2-4oz jars, soil, field scr = 5ppm

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Penny Brockman	2-15-90 / 13:30				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	
		[illegible signature]	2-16-90 / 1030		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: PG-A

PROJECT NAME: Phoenix Goodyear Airport

SAMPLERS: *(Signature)* Penny Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PE90-5	2-15-90	11:35		X	PG-A-SB-005-50/VOC	2X	X						2-4oz jar, soil, field scrn = 7ppm
↓	↓	11:52		X	PG-A-SB-005-55/VOC	2X	X						2-4oz jar, soil, field scrn =
		"	X		Composite Barrel Sample	1X		X					1-8oz jar soil field scrn =

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Penny Brockman	2-15-90 / 7:30				
Relinquished by: *(Signature)*	**Date / Time**	**Received by: *(Signature)***	**Relinquished by: *(Signature)***	**Date / Time**	**Received by: *(Signature)***
Relinquished by: *(Signature)*	**Date / Time**	**Received for Laboratory by: *(Signature)***	**Date / Time**	**Remarks**	
		[signature]	2-16-90 / 1030		

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U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Project

SAMPLERS: *(Signature)* P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
AS90-7	2-19-90	1405		X	PGA-SB-007-05/VOC	2X	X						2-4oz jar soil, fld scrn = .4ppm
		1412		X	PGA-SB-007-10/VOC	2X	X						" " " " .8ppm
			X		PGA-SB-007/TOC	1X		X					1-8oz soil field scrn "
		1418		X	PGA-SB-007-15/VOC	2X	X						2-4oz soil, field scrn = .6ppm
		1428		X	PGA-SB-007-20/VOC	2X	X						" " " " 5.0ppm
		1428		X	PGA-SB-007-QC/VOC	2X	X						" " " " = "
		1440		X	PGA-SB-007-25/VOC	2X	X						" " " " = 5.0ppm
		"		X	PGA-SB-007-QA/VOC	2X	X						" " " " = 5.0ppm
		1450		X	PGA-SB-007-30/VOC	2X	X						" " " " = .6ppm
		"	X	~~X~~	PGA-SB-007-TOC	1X		X					1-8oz jar soil, fld scrn = .6ppm
		"	X		PGA-SB-007-QA/TOC	1X		X					" " " " = .6ppm
		"	X		PGA-SB-007-QC/TOC	1X		X					" " " " = .6ppm
		1510		X	PGA-SB-007-35/VOC	2X	X						2-4oz jar, soil fld scrn = 3.1ppm
		1515		X	PGA-SB-007-40/VOC	2X	X						" " " " = 8.8ppm
		1535		X	PGA-SB-007-45/VOC	2X	X						" " " " = 7.2ppm

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
P Brockman	2-20-90 11:30				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[illegible signature]	2-21-90 10:30	

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ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Project

SAMPLERS: *(Signature)* P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	VOC	TOC					REMARKS
PG-90-7	2-20	~~9:10~~			~~SB~~-								
		9:10		X	PGA-SB-007-50/VOC	2X	X						2-4 oz jars, soil, fld scr = .4 ppm
		9:30		X	~~PGA-SB-007-55/VOC~~	~~2X~~	~~X~~						
		9:30	X		Barrel Composite	1X		X					1-8 oz jar soil
					0'-55'								
		9:30		X	PGA-SB-007-55/VOC	2X	X						2-4 oz jar - soil / fld scr =

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
P Brockman	2-20-90 11:30				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[illegible signature]	2-21-90 10:30	

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.. ARMY CORPS OF ENGINEERS

$15.25

[illegible] - Omaha

CHAIN OF CUSTODY RECORD

W.O.# 6.75

153

PROJ. NO.	PROJECT NAME
	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* Transfer of Samples from MRD to ENRT

STA. NO.	DATE 1990	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TOC - 9060	VOA - 8240						REMARKS
	2/19	1412			PGA-SB-007-10	1	X							[illegible] 900221-009
	2/19	1440			PGA-SB-007-25-QA	2		X						[illegible] 900221-014
	2/19	1450			PGA-SB-007-30	1	X							[illegible] 900221-016
	2/19	145[illegible]			PGA-SB-007-30-QC	1	X							[illegible] 900221-017

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
[signature]	2-22-90 12:58				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

$ 29.75

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

WO# 108

PROJ. NO.	PROJECT NAME	NO. OF CON-TAINERS	DC-9060						REMARKS
	Phoenix Hodges Consort								# 0

SAMPLERS: (Signature) Transfer of samples from MRD to TVA

STA. NO.	DATE 1990	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	DC-9060						REMARKS
	3/19	1450			PGA-SB-007-30-0A	1	X						8 oz glass jar 900221-017

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	3-22-90 1436				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

APPENDIX E

SAMPLING AND ANALYTICAL PLAN

FINAL

SAMPLING AND ANALYTICAL PLAN

PHOENIX-GOODYEAR AIRPORT

Prepared by

U.S. Army Corps of Engineers
Omaha District

22 January 1990

1. INTRODUCTION.

1.1 General Intent. The planned investigation proposed for the Loral facility (formerly the Goodyear Aerospace facility) at the Phoenix-Goodyear Airport (PGA) Superfund site is intended to quantify contamination in the unsaturated zone in areas of the facility which were previously untested. These areas are suspected to contain significant levels of TCE and other volatile organic compounds (VOCs) based on information pertaining to past facility operations, soil gas survey results, and a soil vapor extraction pilot study. This information will help to determine parameters for soil clean-up as well as to provide information relevant to cost-share negotiations. In addition, limited sampling of sediment in a surface water drainage way will be done to better define potential impacts due to transport of waste metals by run-off from the site.

1.2 Environmental Setting.

1.2.1 Location . The PGA study area covers an area of approximately 35 square miles in Maricopa County in the western part of the Salt River Valley, about 17 miles west of Phoenix, Arizona. The site of interest lies within section 16, as shown on Figure 1. Except for the airport, which is owned by the City of Phoenix, the remainder of the PGA site lies almost entirely within the City of Goodyear. Industrial facilities of the Loral Corporation (formerly Goodyear Aerospace Corporation) and Unidynamics-Phoenix, Inc. (UPI) and others are located east and north of the airport, respectively. The City of Avondale occupies about 2 square miles along the eastern border of the City of Goodyear. Figure 2 shows the site location, site boundaries, and major features.

1.2.2 Physiographic and Geologic Setting. The PGA site lies in a desert valley west of Phoenix, Arizona. The land surface slopes very gently south-southwestward toward the Gila River. Broad swales and washes act as the primary surface drainage pathways. The valley occupies a graben filled with over 1000 feet of unconsolidated to semiconsolidated sediments over crystalline bedrock. This sediment was shed from surrounding mountain ranges which have been uplifted as horsts. These basin fill deposits are composed from bottom to top (older to younger) of a Lower Conglomerate Unit (LCU), a Middle Fine-Grained Unit (MFU) and an Upper Alluvial Unit (UAU) (Figure 3).

The LCU overlies a basement complex of volcanic, metamorphic, and sedimentary rocks similar to the surrounding mountains. These basement rocks range in age from pre-Cambrian to Tertiary. The LCU consists variably of cemented sand, gravel, silt, and clay and is usually found at depths greater than 1,200 feet below land surface and extending to an unknown depth below the study area.

The MFU, overlying the LCU, consists predominantly of silty clay to sandy silt with lenses of silty sand. The top of the MFU is usually found between 300 and 400 feet below land surface in the vicinity of PGA, and the bottom extends to approximately 1,200 below land surface.

The UAU overlies the MFU and has been divided into three subunits, A,B, and C. Subunit A consists of gravels and sands from approximately 40 to 120 feet below land surface. From the surface to 40 feet soils consist of clay with varying amounts of silt, sand and gravel. Subunit B extends from approximately 120 to 190 feet below land surface and consists of interbedded materials of which silt, clay, and silty sand predominate. Subunit C consists predominantly of sand and gravel with some silt and clay lenses extending form 190 to 320 feet below ground surface. Between 285 and 320 feet a moderately to well-cemented zone of sand with minor gravel and silt lenses overlies the MFU in Subunit C.

1.2.3 Hydrogeology. For practical purposes at the PGA site, there are three major aquifer systems. Ground water is typically first encountered in Subunit A of the UAU, in an unconfined to semiconfined state at a depth of approximately 50 to 60 feet below ground surface. The aquifer is composed of gravel, sands, and clays with some cobble layers. This aquifer is overlain by unsaturated silty, sandy, or gravelly clays and fine sands, and is underlain by a relatively continuous clay aquitard at approximately 110 feet below ground surface. Coarse sands and gravels, interbedded with silts and clays, comprise an intermediate confined aquifer system designated as Subunit C of the UAU. This aquifer yields significant amounts of water to wells in the area. A lower semiconsolidated clay-rich sand aquifer (MFU) is encountered at approximately 300 feet and is several hundred feet thick. This aquifer also yields significant water to wells.

1.2.4 Climate. The PGA site has a desert climate characterized by long, hot summers and short, mild winters. Relative humidity is low, particularly during early summer, and the rainfall averages about 7.1 inches per year. The average daily maximum temperature in July is 107^{o}F, the average daily minimum temperature in January is 34^{o}F, and the average yearly temperature is 70^{o}F.

1.3 History of PGA Site.

1.3.1 Site Description and History. The PGA site consists of an airport and industrial facilities including several large hangars and manufacturing buildings. The facilities are currently being used. The airport is separated from the industrial facilities by a Southern Pacific railroad spur. The industrial plant on the east side of the spur belongs to the Loral Corporation who purchased the facility from Goodyear

Aerospace Corporation (GAC) in 1987. The airport lies on the west side of the spur and is operated by the City of Phoenix. The Loral plant is currently used for manufacturing of defense related items. Many of the buildings on the airport are leased for industrial operations or training of airline personnel.

The Loral facility was originally built during the early 1940's by Goodyear aircraft as a defense plant. The neighboring airport began at approximately the same time as a Naval Air Facility. The Goodyear Aircraft facility essentially attained its current configuration during WWII with only minor building additions and modifications in subsequent years. The Navy added several buildings in the early 1950's including a large hangar, barracks, and other facilities.

Contamination was identified in wells in the area around the site in 1981 and the site was placed on the National Priorities List in 1984. There have been several rounds of sampling involving soil borings, well installation, and soil gas sampling conducted at the site. These investigations are documented in the final Remedial Investigation Report dated June 1989 prepared by EPA's contractor CH2M-Hill. Contamination has been identified in the Subunit A aquifer from the vicinity of the former GAC /Navy boundary and extending approximately 7000 feet to the southwest. Contamination has been also identified in Subunits B and C in the immediate vicinity of the former GAC/Navy boundary and in Subunit C at some distance from the airport. Work has been underway since March 1989 on an operable unit to clean contaminated ground water from Subunit A southwest of the main developed portion of the airport. The final remedy for other site contamination, including contaminated soils has been determined as stated in the Record of Decision dated September 1989.

1.3.2 <u>Previous Investigations and Results of Soil Sampling at the Loral Facility</u>. Refer to the final Remedial Investigation Report for details of the previous soil sampling at the site. There have been three rounds of soil boring intended to identify sources of volatile organic contamination at the PGA site. The first round was conducted in 1985 using hollow-stem augers and involved the drilling of twelve borings to ground water; six on each the former Navy and Goodyear properties. The second round was conducted in the summer of 1987 using an air casing-hammer rig and involved drilling 19 borings to ground water. Ten of these borings were on former Navy property. Finally, a total of thirteen additional borings were drilled in November, 1987 according to the same sampling plan as the previous round. This last round involved drilling twelve borings on former Navy property and one on the railroad right-of-way which is the boundary between the two properties. All sampling rounds involved attempting to retrieve samples at approximately five foot intervals, although recovery in the coarse-grained zones was often poor. Figure 8 displays the locations of the previous sampling on the Loral facility.

The first boring program attempted to investigate the soils near the hangar aprons, major open drains, and the soils adjacent to the most contaminated production well on the Navy property. It also attempted to confirm the presence of volatiles in the vicinity of several sludge drying beds and the building housing major degreasing operations at the former GAC facility. TCE was found at relatively low levels (less than 1000 ppb) in a boring drilled behind Goodyear building 16 which housed a vapor degreaser used in a plating shop. TCE was found in only one of five borings drilled in the old sludge drying beds at the GAC facility. This boring is only a few hundred feet from the boundary with the former Navy property and the TCE was found in every sample from that boring at concentrations less than 150 ppb. Goodyear has maintained in responses to EPA that no disposal of TCE occurred at the sludge drying beds.

The boring program conducted during the summer of 1987 intended to investigate the cause of high volatile compound concentrations in a soil gas survey at both the former Navy and Goodyear facilities. Only four of the nine borings drilled at the former GAC facility encountered contamination. The two borings which were drilled near the sludge drying beds were both free of TCE, as were three borings drilled at the locations of high TCE concentrations in soil gas along the northern edge of the former GAC property. Two borings, 0903 and 0908, were drilled near the two industrial buildings (Buildings 1 and 16) at the GAC facility which housed degreasing operations and both encountered TCE contamination. Boring 0903 encountered TCE for almost the entire soil column above ground water, including one sample at 2500 ppb. Two borings located in the drummed waste storage areas at the former GAC facility encountered low levels of TCE at depth. Concentrations were less than 260 ppb.

None of the borings drilled in November of 1987 were on Loral property. In general, no significant levels of volatiles were found in these borings above the influence of the contaminated water table, except for levels under 500 ppb found from 5 to 20 feet below grade from hole AC-4. This hole was drilled near a gate leading from the airport to the Loral facility near Yuma Road.

In 1988, a pilot soil vapor extraction system was run on Loral property near the southwest corner of Building 1 on Loral property in the vicinity of holes 0903 and 0908. This pilot study is documented in Appendix S of the RI/FS. This pilot study involved soil vapor extraction from only one hole and indicated significantly larger quantities of TCE in soils than anticipated based on soil sampling results. Over 30 lbs. of volatiles were removed per day for much of the two-week test period. A similar pilot study was conducted in an area on the airport property with significantly lower quantities of TCE removed from the soil.

2. SOIL SAMPLING METHODOLOGY.

2.1 Drilling Method. All soil sampling will be done using a CME 75 drill rig and 6-inch O.D. (3 1/4 inch I.D.) hollow-stem auger (HSA). The drilling rig will be free from hydraulic leaks which could contaminate the samples. If drilling inside of buildings, the exhaust from the drill rig will be directed outside of the building by tubing. Only vegetable oil or teflon tape, depending on field performance, will be used on the drill pipe joints. Borings drilled on the Loral property will, in general, require coring through pavement. Core diameter will be sufficient to permit drilling with 6" O.D. HSA.

2.2 Obtaining the Sample.

2.2.1 Soils

2.2.1.1 Sampling Equipment. All sampling for chemical analyses will be done using a stainless steel split-spoon, 24 inches in length and 3 inches O.D. (2 3/8 inch I.D.). A steel sand catcher will also be used to retain the sandy soil in the spoon. Spatulas and other utensils which contact the sample during sample preparation will also be stainless steel.

2.2.1.2 Downhole Sample Retrieval. When the auger is advanced to the top of the desired sampling interval, the center plug will be withdrawn and the decontaminated split-spoon will be lowered into the hollow-stem auger on the end of the appropriate drill rod. The split-spoon will be driven, preferably at least 18 inches or to refusal (more than 60 blows per 6 inches), using a 300 pound weight falling 30 inches. The number of blows it takes to drive each 6 inch increment will be noted by the driller and subsequently recorded by the geologist. Once driven, the spoon and rod are withdrawn from the auger and the spoon is removed from the rods by the geologist or a helper wearing clean nitrile gloves. These gloves will not be worn during other drilling or sample handling activities and will be stored in a clean location. If sampling inside of a building, where the background levels of volatiles, from either the borehole or the industrial operations in the building, may influence the integrity of the sample, the sample handling and packaging will be done outside of the building. The spoon will be opened by the geologist; however, the spoon will not be opened inside of a building. The amount of sample recovery will be measured and appropriate grab samples and composite samples will be taken from the spoon or the necessary information for logging will be taken. If sample volume is not sufficient for analytical requirements, the previously sampled interval will be augered out and another spoon driven into the interval just below the bottom of the previous interval. After the soil is removed from the spoon, the split-spoon will then be decontaminated.

2.2.1.3 Borehole/Sample Screening. Prior to taking each split-spoon sample, the air quality at the top of the open auger will be measured using an HNu meter, (as will the air quality in the breathing zone at that time). The background or ambient HNu reading representative of the site will be determined prior to drilling at a location. For split-spoon samples where the sample volume allows, a portion of the sample will be placed in a new, clean plastic bag inside of a clean glass jar which is subsequently covered with foil. While the rest of the sample is being processed and packaged, the sample in the foil-covered jar will be allowed to offgas some of any volatiles present. Upon completion of the sample packaging for the rest of that sample, the headspace (air inside the foil-covered jar) will be tested with the HNu by inserting the HNu probe through the foil. These readings will provide real time information on relative levels of volatile contaminants. All HNu readings will be noted on the log and differentiated as to type (i.e. headspace, top of augers, breathing zone, etc.).

2.2.2 Water Water samples will be obtained from the saturated zone from selected borings in order to supplement existing data on TCE levels in the ground water. The water samples will be collected with a HydroPunch sampling device.

2.2.2.1 Equipment Description . The HydroPunch is a sampling device that allows collection of ground water samples without installation of a monitoring well. It is constructed primarily of stainless steel, with some Teflon parts. The sampler is slightly over five feet long when closed, and slightly over six feet long when opened. The principle components are an outer sleeve, a barbed drive point, a perforated section of pipe for sample intake, a sample chamber, and an adapter to attach the sampler to the drill rod. These components are all constructed of stainless steel. The perforated sample inlet section is covered by a polypropylene or stainless steel screen to reduce sample turbidity. The screen is replaceable to prevent cross contamination.

In its retracted position, the screened inlet is protected by the outer sleeve. Once the HydroPunch is driven or pushed to its sampling depth, the outer sleeve is retracted, exposing the screened inlet. The barbed point holds the inlet section in place while the outer sleeve is retracted. Hydrostatic pressure in the aquifer forces water through the screen and into the sample chamber. When the sampler is removed from the ground, the sample is held in the sample chamber by stainless steel check valves. Once retrieved at the surface, the barbed point is taken off the sampler. A stainless steel and Teflon discharge device attaches to the bottom of the HydroPunch. This unseats the lower check valve and the sample is transferred into the sample bottle through a teflon stopcock and teflon tubing.

The HydroPunch is supplied with a series of cleaning brushes for decontamination. Cleaning of the interior of the sampler with a steam cleaner is not practical. Therefore, decontamination of the interior of the sampler must consist of washing, brushing, and multiple rinsing with distilled or deionized water. Several O-rings and the check balls must be inspected for wear when using the HydroPunch, and replaced when necessary. As stated previously, the polypropylene or stainless steel screens are changed with each sample to prevent cross contamination.

2.2.2.2 Sample Collection . The HydroPunch sampling device will be inserted into the hollow stem auger. The sampler will then be pushed using the rig hydraulics or driven using a 140 pound hammer. The preferred method is to drive the sampler with short blows of the 140 pound hammer. This helps prevent bending of the sampler by overdriving or driving the sampler when it is not fully supported in the boring.

Once the sampler is seated in two to three feet of undisturbed soil, the outer sleeve will be retracted and a ground water sample taken. Sufficient time will be given to allow the sampler to fill. The sampler will then be withdrawn from the ground. A bottom discharge assembly will then be inserted into the sampler. The sample will then be placed in two 40 ml VOA vials by opening the stopcock. If enough sample volume has not been obtained, the sampling procedure will be repeated.

The minimum depth a sample will be taken is six feet below the free ground water surface. At depths less than this there may be insufficient hydrostatic head to allow complete filling of the sample chamber.

2.2.3 Sediment Sampling Sediment samples will be recovered using a stainless steel cup attached by bolts or similar fasteners to an aluminum or steel pole. The cup will be lowered through the water to the bottom of the center of the channel of the ditch. The sampling will be done with field personnel standing on the bank of the ditch, not in the water. The cup will be scraped along the bottom of the channel to retrieve shallow sediment. The cup filled with sediment will be raised slowly back through the water to the surface where it will be transferred to the appropriate sample containers. If additional sample is required, the procedure will be repeated just upstream of the previous sampling point to minimize the affect of turbidity created by the previous sampling.

2.3 Sample Preparation and Packaging.

2.3.1 Sample Preparation.

2.3.1.1 Soils. VOC samples will be taken immediately before taking the field screening sample. These samples will be taken from the middle of the recovered split-spoon core and placed in two 4 oz glass jars. The jars will be filled (NO headspace allowed - efforts to settle sand will be made before sealing the jar) and sealed with teflon septum lids. Duplicates will be taken by splitting the retrieved core lengthwise. One of the VOC samples will be taken from one side and the duplicate from the other. Sampling for total organic carbon (TOC) will be done by taking the retrieved core and compositing the material after the VOC samples have been taken. Compositing will be done by crushing and mixing the sample in a decontaminated stainless steel bowl with a stainless steel spatula or spoon, quartering the sample, and taking equal portions of each quarter to fill one eight-ounce wide mouth glass jars. The jars will be filled 3/4 full and sealed with a Teflon-lined lid. Each jar will be labeled for all analyses at the site. The handling of sediment samples will be the same as for split-spoon samples for TOC; they will be composited and placed in 8 oz wide-mouth jars.

2.3.1.2 Water. The water sample obtained by the HydroPunch will be placed in two (2) 40 ml glass vials. Care will be taken to ensure that there are no headspace or air bubbles present in the vials. The water samples will not require any acidification.

2.3.2 Duplicates, Splits, and Blanks. Duplicate and split samples for the various analyses will be taken at a rate of approximately one for every ten samples. No trip blanks or rinsates will be taken for soils, as recommended by MRD; however, they will taken for the water samples. A trip blank will be obtained for every day water samples are taken, given the common use of volatile solvents at the industrial facility. In addition, one rinsate sample will be taken following a typical decontamination of the HydroPunch instrument. The single rinsate will suffice given the consistency planned in the composition of the field crew and decontamination procedures. If procedures are altered, another rinsate will be taken. Rinsates will be taken by pouring distilled water through the assembled HydroPunch sample chamber and collecting the rinsate in 40 ml glass vials.

2.4 Labels, Chain of Custody, and Sample Shipment.

2.4.1 Labels. All sample jars will be labeled after the lid is sealed. The labels will be prepared in advance by the MRD Laboratory using a new bar code format that will facilitate logging in samples at the lab and will minimize time spent in the field labeling sample jars. The label will contain (preprinted) the sample number, project code (PGA - Loral), station number (boring number PG90-1, etc.), required analyses and whether it is a grab or composite sample. The field sampler shall add the date and collection time, the depth of the sample, and the sampler's initials to the label with an indelible pen at the time of sampling. The sample number, collection time, and type of analyses will also be marked on the boring log along side the indicated sampling interval. An example sample label is shown on Figure 4.

The sample number will consist of alphanumeric characters which symbolize the site and type of sample, the boring and the depth, in that order. The site shall be denoted PGA for Phoenix Goodyear Airport. Sample types shall be denoted as "SB" for soil boring, "GW" for a ground water sample, or "SS" for a sediment sample. The borings or sample locations are numbered PG90-1 thru 11, and the last part of this number will be incorporated into the sample number. The depth in feet will be given as the nominal depth (i.e. a sample from a depth of 50 feet shall be denoted as 050 in the sample number). Thus a sample number PGA-SB-003-020 indicates a soil boring sample from the Phoenix Goodyear Airport site, from a depth of 20 feet from boring PG90-3. Splits and duplicates will be prearranged, to the extent possible, with the MRD Lab.

No preservatives will be added to the samples, but all samples will be placed on ice. The samples will be shipped within 24 hours of sampling and every effort will be made to ship the samples the same day.

2.4.2 Chain-of-Custody Forms. This form is intended to track the samples through all persons who have had custody of the samples. An example form is shown in Figure 5, however the MRD Lab is currently working on a custody form that will have some of the information printed in advance. This form may not be ready by the time sampling is to commence. The chain-of-custody form must match what is actually in the cooler. This form will show the project (site) name, station location (boring number), station number (depth), date and time of collection, name and signature of person(s) doing sampling, type of sample (composite or grab), number of containers, and required analyses. One line will be used for each jar. For example, one line will be used for the 4 oz glass vials for the VOC analyses, and another line for the one eight-ounce jar for TOC, even though the samples are from the same nominal depth. Separate lines will also be used for duplicates. Under the remarks column, the sample number and container type will be marked. In addition, the form must be signed as relinquished and dated by the sampler in the lower portion of the form when the samples are given over to the shipper. The original copy of the form is transported with the samples, and the copy is for submission with the drilling logs. The samples must be kept under direct observation by the sampler or locked in a secure place prior to shipment.

2.4.3 Packaging and Shipment. The lids of sample jars will be taped down, with the exception of VOC sample jars. All jars will be wiped off prior to placement in the coolers. The jars will be kept in a shaded, cool place until they are placed in the coolers. The time between sample preparation and labeling and placement on ice will be minimized and will not exceed 10 minutes. The labeled jars will be enclosed in clear ziplock bags and placed upright on at least three inches of packing material in coolers provided by the MRD lab. No jar will touch another, and packing material will be placed around them to prevent them from touching during transport. The frozen blue ice containers provided with the coolers will be placed among the samples along with the packing material. The samples will be covered to the top of the cooler with more packing material. The signed chain-of-custody forms will be placed in a ziplock plastic bag and taped to the top of the cooler just before the samples are turned over to the shipper. The cooler's latch will be locked and the cooler lid taped shut by strapping tape at two locations. Custody seals, signed and dated, will be affixed across the lid seam and covered by nylon-reinforced strapping tape. Assume that at least two coolers will be shipped per day. All samples will be shipped within 24 hours of obtaining samples by Federal Express Overnight Delivery to the MRD Laboratory Attn.: CEMRD-ED-L Dr. Joe Solsky, 420 S. 18th St., Omaha, Nebraska. 68102-2586. If delivery is to be on Saturday, Dr. Solsky will be contacted at (402) 444-4304 as soon as it it known and at least by Friday noon. In addition, contact Dr. Solsky the day before the first samples are sent to the lab from the site. The MRD Laboratory will be the Quality Control laboratory.

2.5 Decontamination.

2.5.1 Drilling Equipment. A wash rack will be used for decontamination of all drilling equipment north of building 6 on the Loral facility, with permission from the appropriate Loral personnel. The rig and drilling pipe (both auger and drill rod) will be steam cleaned using a high temperature, high pressure steam cleaner filled with clean water from a City of Goodyear fire hydrant. Arrangements for this source are currently being made. Care will be taken to clean all work surfaces and the vehicle wheels. Any other vehicle which potentially contacts contaminated material will be decontaminated. The drill rig and equipment will be decontaminated prior to the start of work and before drilling at each borehole.

2.5.2 Sampling Equipment. All stainless steel split-spoons, (and shoes and subs) will be decontaminated by an alconox wash followed by a tap water rinse, followed by a isopropanol rinse, followed by a deionized water rinse. When drilling in buildings, decontamination will be done outside of the buildings. Spilt-spoons shall be wrapped in aluminum foil following decontamination and shall stay wrapped until just prior to being lowered into the HSA for sampling. All other sampling equipment, bowls, spatulas, etc. will be decontaminated by the wash and rinsing procedures. The waste liquids from the decontamination procedures will be drummed and labeled. The drum contents will be taken to a sanitary sewer inlet at Loral's sewage treatment plant. Arrangements for this disposal means are currently being made.

2.6 Logs and Backfilling.

2.6.1 Logs. A complete and accurate field log for each boring will be prepared. Each log will include name of project, hole number, location of boring, type of drill rig, size and type of bit used, diameter of boring, location and number of each sample, blow counts (note size of split-spoon), water level information (include time-lapse between completion of drilling and measurement), and description of the materials. Soil materials will be classified using the Unified Soil

Classification System. Soil description to follow ASTM D 2488-84. Rock descriptions (particularly for gravel clasts) will use nomenclature prescribed in ASTM C 294-69). Description of material will include classification, consistency or density, plasticity, moisture content, color, etc. Description is to be based on visual inspection of material in the field and on blow counts of the penetration tests. The HNu readings from field screening will be recorded on the log. In addition, the time and date each sample was taken, along with the sample numbers, will also be recorded on the log under the remarks column next to the sample depth. A typical log form is provided as Figure 6. Logs will be submitted to the Corps District office after the completion of each borehole. Finally, a bound notebook will be used to record any unusual circumstances or conditions which could affect the results of each sample. These notes will be arranged by sample, and will include all sample numbers taken under those conditions.

2.6.2 Backfilling. To comply with State of Arizona drilling regulations, all borings shall be backfilled their entire depth with cement grout. If borings were cored through surface pavement the top of the boring shall be topped off with cement or asphalt to recreate the original pavement type. Drill cuttings shall be stored in DOT approved drums until analytical results are available and disposal can be arranged by the Corps of Engineers.

2.7 Surveying. Boring locations will be made with a tape from permanent buildings, wells, or other permanent features present at the site and shown on base maps on which coordinates are identified. In this way the horizontal coordinates of the borings can be determined. Only horizontal coordinates are necessary given the low relief and the fact that ground water elevations will not be needed.

2.8 Project Organization. The Project Manager is Stan Bauer (CEMRO-ED-EA, (402) 221-7808). He is responsible for integrating and coordinating all investigative and design work at these sites among the various disciplines. The Project Geologist is Steve Pearson (Geologist, CEMRO-ED-GC, 221-4418). The alternate project geologist is Dave Becker (Chief, CEMRO-ED-GC, 221-4494). The Project Geologist is responsible for assuring that the proposed sampling plan supports the intent of the work. The Project Geologist reports the progress of the investigative work to the Project Manager. The Geology Section Field Coordinator, Carl Nardin (221-4496), is responsible for coordinating all resources necessary for the field investigation. For this work, Steve Pearson (Geologist, CEMRO-ED-GC) will be Site Manager. The Site Manager is responsible for insuring that all procedures specified in this plan are carried out in the field. He is responsible for directing the work of the Driller and the assistant geologist. The Driller (CEMRO-ED-GC) is responsible for drilling, maintaining the drilling equipment, and obtaining all samples as required. He will advise the Site

Manager on the best way to achieve the goals of the drilling program and directs the work of the drill helpers. The project chemist is John Sartore (Chemist, CEMRO-ED-ET, 221-7836). The Project Chemist has the responsibility of assuring that all analytical work fully supports the intent of the investigation. The point of contact for sample analysis at the MRD Laboratory is Dave Splichal (Chemist, CEMRD-ED-L, 402-444-4300). The MRD contact is responsible for supporting the field effort with necessary analytical supplies (bottles, coolers, etc.), for directing the analyses of the samples, and for reviewing the quality of the results.

2.9 Daily Reports. In addition to sending in logs after the completion of each borehole, daily reports (Figure 7) will be completed by the Site Manager after each day's work. These will include information on personnel and equipment working at the site, work performed (including samples taken), weather conditions, safety levels (D, modified D, C, etc.) and equipment, quality control activities (such as HNu background readings, decontamination procedures), and problems encountered. These daily reports will be distributed each day by the Site Manager as follows:

1 copy to S. Bauer, COE, Omaha District
1 copy to S. Cotter, COE, Omaha District
2 copies to office (215 N. 17th St., Omaha, NE 68102-4910 CEMRO-ED-GC Attn.: Stewart)
1 copy for the Site Manager's files

3. SITE SAMPLING LOCATIONS AND DEPTHS. The site sampling locations and depths discussed in these sections are not intended to be rigid. The use of non-contract crews and labs gives the flexibility to tailor the field program to discovered site conditions. Within the constraints of permits and budget, the program is subject to change based on what is observed. In addition, some locations may be modified or eliminated due to access or utility problems.

3.1 Site - Loral Facilities.. A total of 8 locations have been identified for sampling at the Loral facilities. These locations are shown on Figure 8. One soil boring will be drilled at each location to the top of the ground water table. Ground water is anticipated to be encountered at approximately 50-60 feet. Soil sampling will be conducted at five-foot intervals to assure an accurate log and to identify relatively thin contaminated zones. The five-foot interval has been consistently used in previous sampling rounds. Assuming all 8 borings are drilled and each boring is drilled to 60 feet, a total of 96 intervals will be sampled. In addition, water samples will be obtained (using the HydroPunch) from two borings located in the interior of the Loral facility in areas not currently monitored by existing wells. The soil/water sampling locations and the intent of each are summarized in Table 1.

3.2 Drainage Ditch One sediment sample is to be taken as described previously at each of the three locations shown on Figure 9. One sample is located just downstream of the tiled portion of the ditch. Another location has been selected near the treatment plant where a dross pile (abandoned smelter location) was encountered during plant construction. The third sediment sampling point is located just off the airport property. These samples are intended to fill a data gap regarding the transport of metals contamination from the PGA site via sediment/surface water. This is necessary for the adequate evaluation of the risk posed by the site. The ditch is occassionally dredged to deepen the channel. Therefore the samples collected will be an indication of recent sediment and contaminant transport.

4. ANALYTICAL PLAN AND SITE-SPECIFIC ANALYTICAL REQUIREMENTS

4.1 Analytical Plan

1. Soil/Sediment Samples. This listing includes all potential protocol for all sites to be sampled. See site-specific section for particular analytical requirements. All assay methodology shall be EPA SW 846 Methodology unless otherwise stated. Soil samples submitted for Volatile Organic Compounds shall be analyzed by EPA Method 8240. This analysis shall include a ten (10) peak library search for the tentative identification of the most prevalent compounds not on the Hazardous Standard List.

Total Organic Carbon shall be analyzed by SW 846 9060. Total Organic Carbon (TOC) shall be run on two soil samples from each borehole.

Sediment samples submitted for Total Priority Pollutant Metals (including Barium) shall be analyzed by EPA method 3050/6010 except Arsenic, Mercury and Selenium which are to be analyzed by methods 3050/7060, 7471, and 3050/7740. Soil/Sediment assay results are to be reported on a dry weight basis.

2. Water Samples submitted for Volatile Organic Compounds shall be run by EPA method 8240. This shall include a ten (10) peak library search for the tentative identification of the most prevalent compounds not on the Hazardous Standard list.

4.2 Site Specific Analyses

4.2.1 Site - Loral Facilities

1. Boring Number PG90-1 West Side of Bldg. 86. One soil boring consisting of approximately 12 soil samples. Assay the soil samples for the following:

a. Volatile Organic Compounds
b. Total Organic Carbon

2. Boring Number PG90-2 Adjacent to Sewage Treatment Plant. One soil boring consisting of approximately 12 soil samples. Assay the soil samples for the following:

a. Volatile Organic Compounds
b. Total Organic Carbon

3. Boring Number PG90-3 West of Bldg 16. One soil boring consisting of approximately 12 soil samples. Assay the soil samples for the following:

a. Volatile Organic Compounds
b. Total Organic Carbon

4. Boring Number PG90-4 Southwest of Bldg. 1. One soil boring, consisting of approximately 12 samples. Assay the soil samples for the following:

a. Volatile Organic Compounds
b. Total Organic Carbon

5. Boring Number PG90-5 West side of Bldg. 1. One Soil Boring consisting of approximately 12 samples. Assay the soil samples for the following:

a. Volatile Organic Compounds
b. Total Organic Carbon

6. Boring Number PG90-6 Inside Bldg. 1 by large vapor degreaser (in NW corner of Bldg.). One soil boring consisting of approximately 12 soil samples. A water sample will be obtained from this boring. Assay the samples for the following:

<u>Soil Samples</u>
a. Volatile Organic Compounds
b. Total Organic Carbon

<u>Water Samples</u>
a. Volatile Organic Compounds

7. Boring Number PG90-7 East side of of Bldg 6. One soil boring consisting of approximately 12 soil samples. Assay the soil samples for the following:

a. Volatile Organic Compounds
b. Total Organic Carbon

8. Boring Number PG90-8 West Side of Bldg. 26. One soil boring, consisting of approximately 12 soil samples. Also one ground water sample will be taken. Assay the soil samples for the following:

<u>Soil Samples</u>
a. Volatile Organic Compounds

b. Total Organic Carbon

Water Sample
a. VOC

4.2.2 Site - Drainage Ditch

1. Three Sediment samples shall be taken from the Drainage Ditch. Assay the three sediment samples for the following:

a. Priority Pollutant Metals

TABLE 1

Boring #	Location	Rationale
PG90-1	West side of bldg 86	This is to investigate soil contamination at depth immediately next to a abandoned sump or pit discovered there in 1986 which contained sediment contaminated with elevated levels of TCE.
PG90-2	Adjacent to Sewage TP	This is to identify contamination associated with possible past disposal of volatiles/metals to a sewage sludge bed.
PG90-3	West of bldg 16	This is to investigate potential volatile organics and metals contamination resulting from the operation of a TCE degreaser and plating shop in the northern part of building 16.
PG90-4	Southwest of bldg 1	This boring is to intended to investigate contamination from leaking storm sewers and floor drains beneath building 1.
PG90-5	W side of bldg 1	This is intended to identify any contamination at depth resulting from the operation of a possible former TCE storage tank at that location.
PG90-6	Inside bldg 1 by large vapor degreaser (in NW corner of bldg)	This is intended to investigate contamination at depth resulting from possible leakage from floor drain or other facilities associated with the large vapor degreaser and cleaning vats at this location. A water sample will be taken from this boring.
PG90-7	East side of bldg 6	This boring is intended to investigate contamination from leaking storm sewers and floor drains beneath building 6.
PG90-8	W side of bldg 26	This is intended to investigate the contamination at depth possibly resulting from the operation of a former vapor degreaser located in this building. Odors have been reported by employees working in offices located at the former site of the degreaser. A water sample will be obtained from this boring.

TABLE 2.0

WATER SAMPLING SPECIFICATIONS

PARAMETER	CONTAINER*	SAMPLE PRESERVATION	HOLDING TIME
VOLATILE ORGANICS	TWO 40-ML GLASS VIALS, NO HEADSPACE	ICE TO 4o C	ANALYZE IN 14 DAYS < 24 HOURS ON SITE

* ALL CONTAINERS MUST HAVE TEFLON-LINED LIDS (SEPTA FOR VOA'S)

TABLE 3.0

SOIL/SEDIMENT SAMPLING SPECIFICATIONS

PARAMETER	CONTAINER*	SAMPLE PRESERVATION	HOLDING TIME
VOLATILE ORGANICS	TWO-4 OZ GLASS BOTTLES, COMPLETELY FULL	ICE TO 4o C	ANALYZE IN 14 DAYS, <24 HOURS ON SITE
METALS	1-8 OZ GLASS WIDE MOUTH	ICE TO 4o C	6 MONTHS Hg 28 DAYS IN GLASS, 13 DAYS IN PLASTIC
TOTAL ORGANIC CARBON	1-8 OZ GLASS WIDE MOUTH BOTTLE, 3/4 FULL	ICE TO 4o C	6 MONTHS

* ALL CONTAINERS MUST HAVE TEFLON-LINED LIDS (SEPTA FOR VOA'S)

TABLE 4.0

PARAMETER	QUALITY CONTROL SAMPLES NO.OF FIELD SAMPLES	NO.OF FIELD SPLIT/ DUP.	NO.OF SAMPLER RINSATES	NO.OF TRIP BLANKS	TOTAL AE SAMPLES	QUALITY ASSURANCE SAMPLES FIELD SPLITS	SAMPLER RINSATES	TRIP BLANKS	TOTAL QA SAMPLES
SOIL SAMPLES									
Sample No. PG90-1 West Side of Bldg. 86									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1
Sample No. PG90-2 Adjacent to Sewage TP									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1
Sample No. PG90-3 West of Bldg. 16									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1
Sample No. PG90-4 Inside Bldg. 1									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1
Sample No. PG90-5 West Side of Bldg. 1									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1

TABLE 4.0

PARAMETER	NO.OF FIELD SAMPLES	NO.OF FIELD SPLIT/ DUP.	NO.OF SAMPLER RINSATES	NO.OF TRIP BLANKS	TOTAL AE SAMPLES	FIELD SPLITS	SAMPLER RINSATES	TRIP BLANKS	TOTAL QA SAMPLES
	QUALITY CONTROL SAMPLES					QUALITY ASSURANCE SAMPLES			
SOIL SAMPLES									
Sample No. PG90-6 Southwest of Bldg 1									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1
Sample No. PG90-7									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1
Sample No. PG90-8 West Side of Bldg. 26									
VOC	12	1	0	0	13	1	0	0	1
TOC	2	1	0	0	3	1	0	0	1

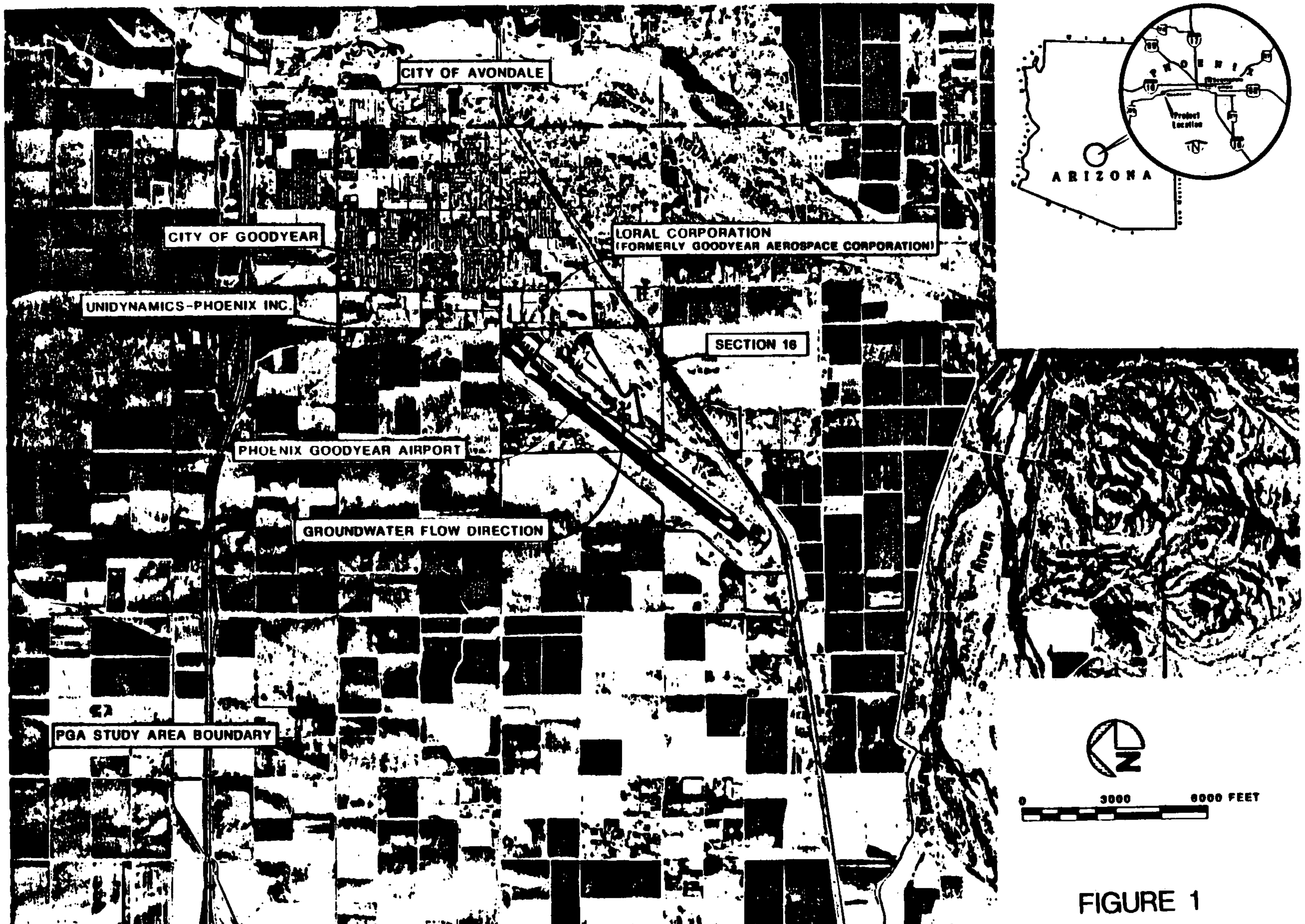
TABLE 5.0

PARAMETER	NO.OF FIELD SAMPLES	NO.OF FIELD SPLIT/ DUP.	NO.OF SAMPLER RINSATES	NO.OF TRIP BLANKS	TOTAL AE SAMPLES	FIELD SPLITS	SAMPLER RINSATES	TRIP BLANKS	TOTAL QA SAMPLES
	QUALITY CONTROL SAMPLES					QUALITY ASSURANCE SAMPLES			
WATER SAMPLES									
Sample No. PG90-6 Inside of Bldg 1									
VOC	1	1	0	0	1	1	0	0	1
Sample Number PG90-8 W side of Bldg 26									
VOC	1	1	0	0	1	1	0	0	1

TABLE 6.0

PARAMETER	QUALITY CONTROL SAMPLES: NO. OF FIELD SAMPLES	NO. OF FIELD SPLIT/ DUP.	NO. OF SAMPLER RINSATES	NO. OF TRIP BLANKS	TOTAL AE SAMPLES	QUALITY ASSURANCE SAMPLES: FIELD SPLITS	SAMPLER RINSATES	TRIP BLANKS	TOTAL QA SAMPLES
SEDIMENT SAMPLES									
Priority Pollutant Metals	3	1	0	0	4	1	0	0	1

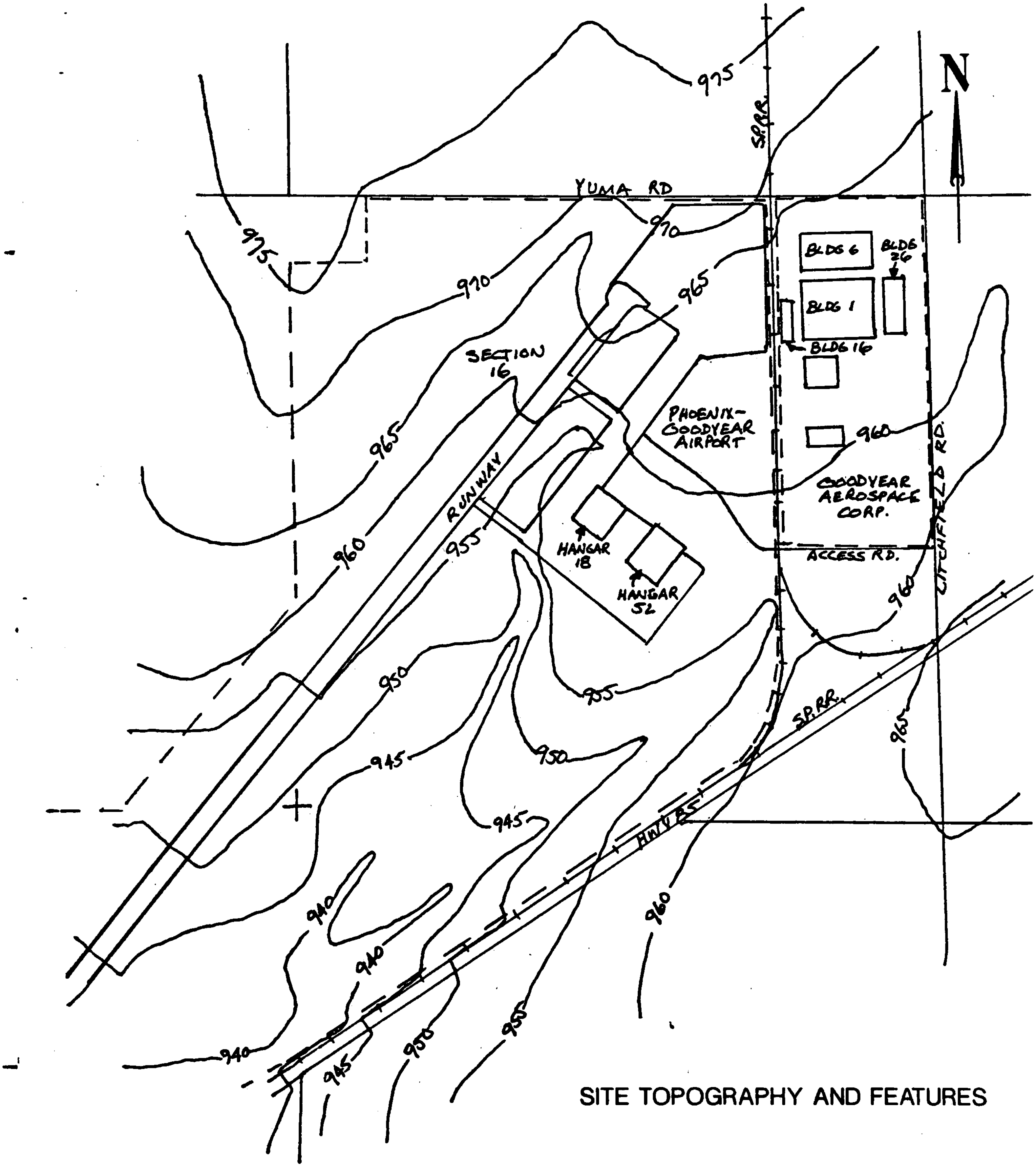
LIST OF FIGURES



RDD63605.AD FEBRUARY 1989 REVISED JUNE 1989

FIGURE 1

SITE LOCATION MAP



SITE TOPOGRAPHY AND FEATURES

PHOENIX GOODYEAR AIRPORT SITE

FIGURE 2

PHOENIX-GOODYEAR AIRPORT SITE

Generalized Cross-Section

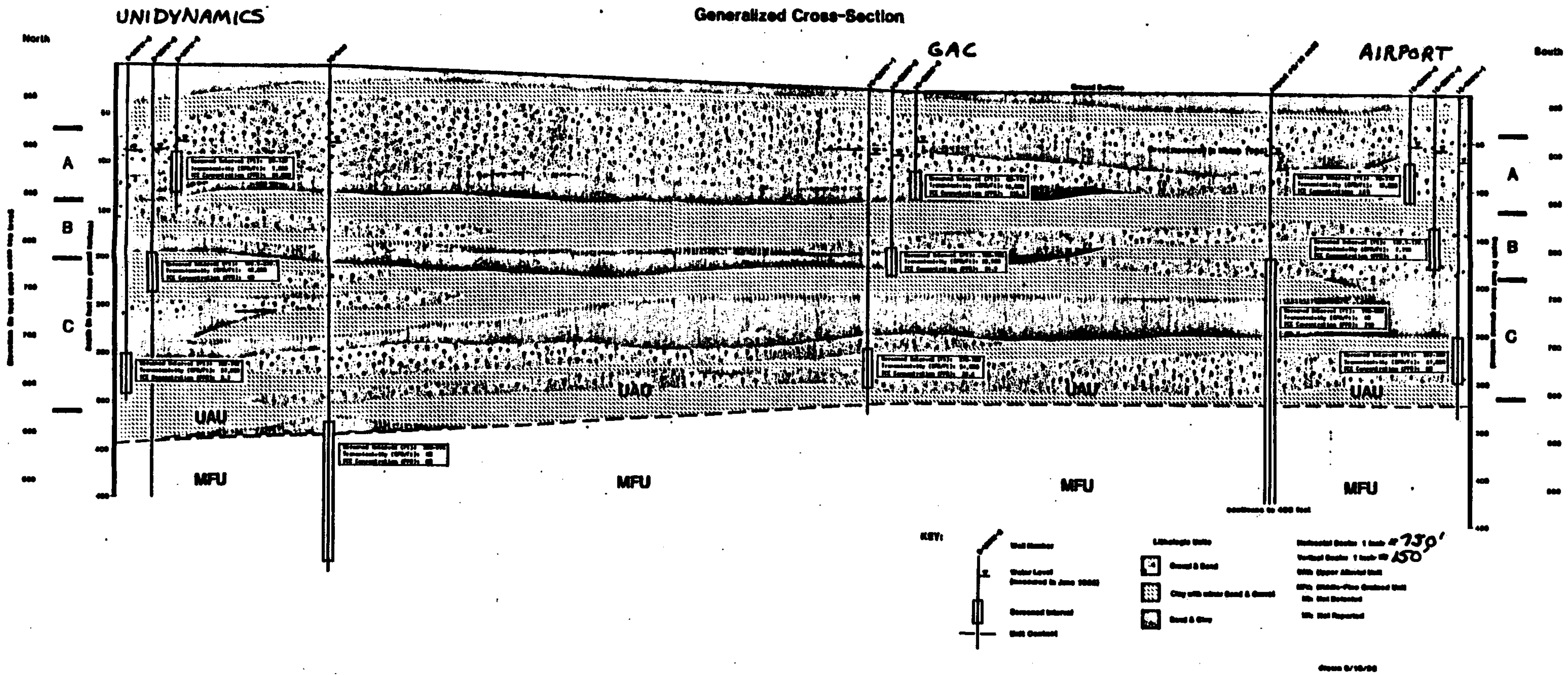


FIGURE 3

Project: Phoenix-Goodyear Airport Sampler: __________

499/PGA-SB-001/VOC

Type: grab Preservative: 4 deg C Matrix: soil

Date: ____________ Time: __________ Depth: ________

FIGURE 4

CHAIN OF CUSTODY RECORD

Proj. No.

Project Name

Samplers *(Signature)*

No. Of Con tainers

Remarks

Sta. No.	Date	Time	Comp.	Grab	Station Location								

Important: Samples are first relinquished by the sampler (as above) who also signs the Shippers Certification from Federal Express.

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks:	

FIGURE 5

Hole No.

DRILLING LOG	DIVISION	INSTALLATION	SHEET OF SHEETS

1. PROJECT	10. SIZE AND TYPE OF BIT
	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
2. LOCATION (Coordinates or Station)	12. MANUFACTURER'S DESIGNATION OF DRILL
3. DRILLING AGENCY	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
4. HOLE NO. (As shown on drawing title and file number)	14. TOTAL NUMBER CORE BOXES
5. NAME OF DRILLER	15. ELEVATION GROUND WATER
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ______ DEG. FROM VERT.	16. DATE HOLE — STARTED — COMPLETED
	17. ELEVATION TOP OF HOLE
7. THICKNESS OF OVERBURDEN	18. TOTAL CORE RECOVERY FOR BORING %
8. DEPTH DRILLED INTO ROCK	19. SIGNATURE OF INSPECTOR
9. TOTAL DEPTH OF HOLE	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SAMPLE LOG			FIGURE 6

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

(TRANSLUCENT)

DAILY EXPLORATIONS REPORT

Date of Work ____________

LABOR

SHIFT NO. ______

EMPLOYEE	HOURS	RATE	AMOUNT

Direct Labor	
Indirect Overhead ______ %	
Per Diem No. ______ X ______	
Total Labor	

EQUIPMENT

PLANT NO.	EQUIPMENT DESCRIPTION	FUEL*	C/G	AMOUNT
TOTAL EQUIPMENT *INDICATE DIESEL OR GASOLINE				

MATERIALS

ITEM	AMOUNT
TOTAL MATERIALS	

Hole No. ____________

Location ____________

Land Owner ____________

Type of Drill ____________

Drilled: from ____________

to ____________

Footage ____________

Casing Set ____________

Casing Pulled ____________

Casing Lost ____________

Hours Drilling ____________

Hours Moving ____________

Hours Shut Down ____________

No. of Samples ______ Type ______

Project ____________

Cost Code ____________ ______

Request No. ____________

Total Labor ____________

Total Materials ____________

Total Equipment ____________

Total Cost ____________

WEATHER and GROUND CONDITIONS: ____________

Remarks: ____________

Signature:

MRD FORM 1 AUG 82 074 (Previous Editions May Be Used Until Supply Is Exhausted)

FIGURE 7

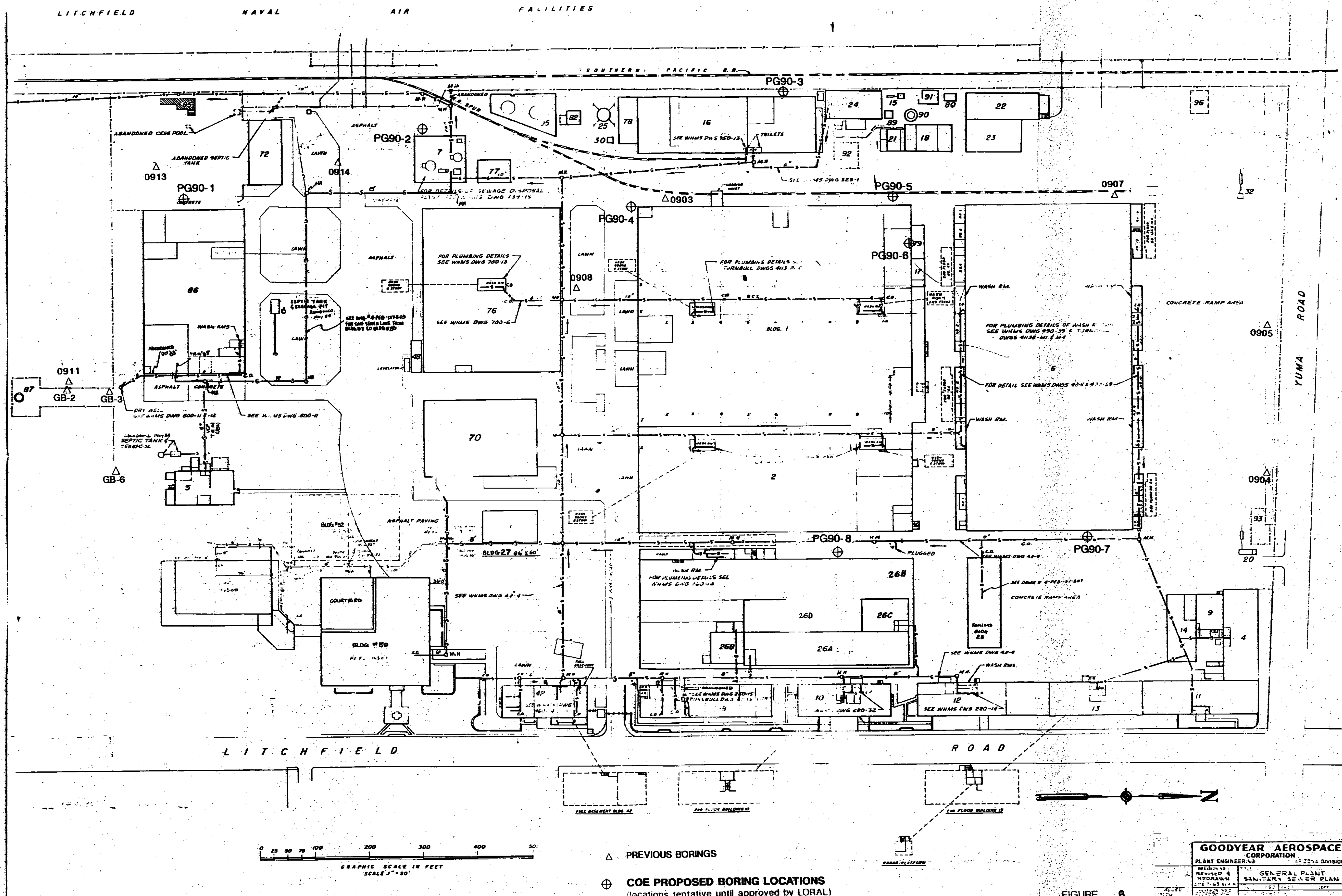
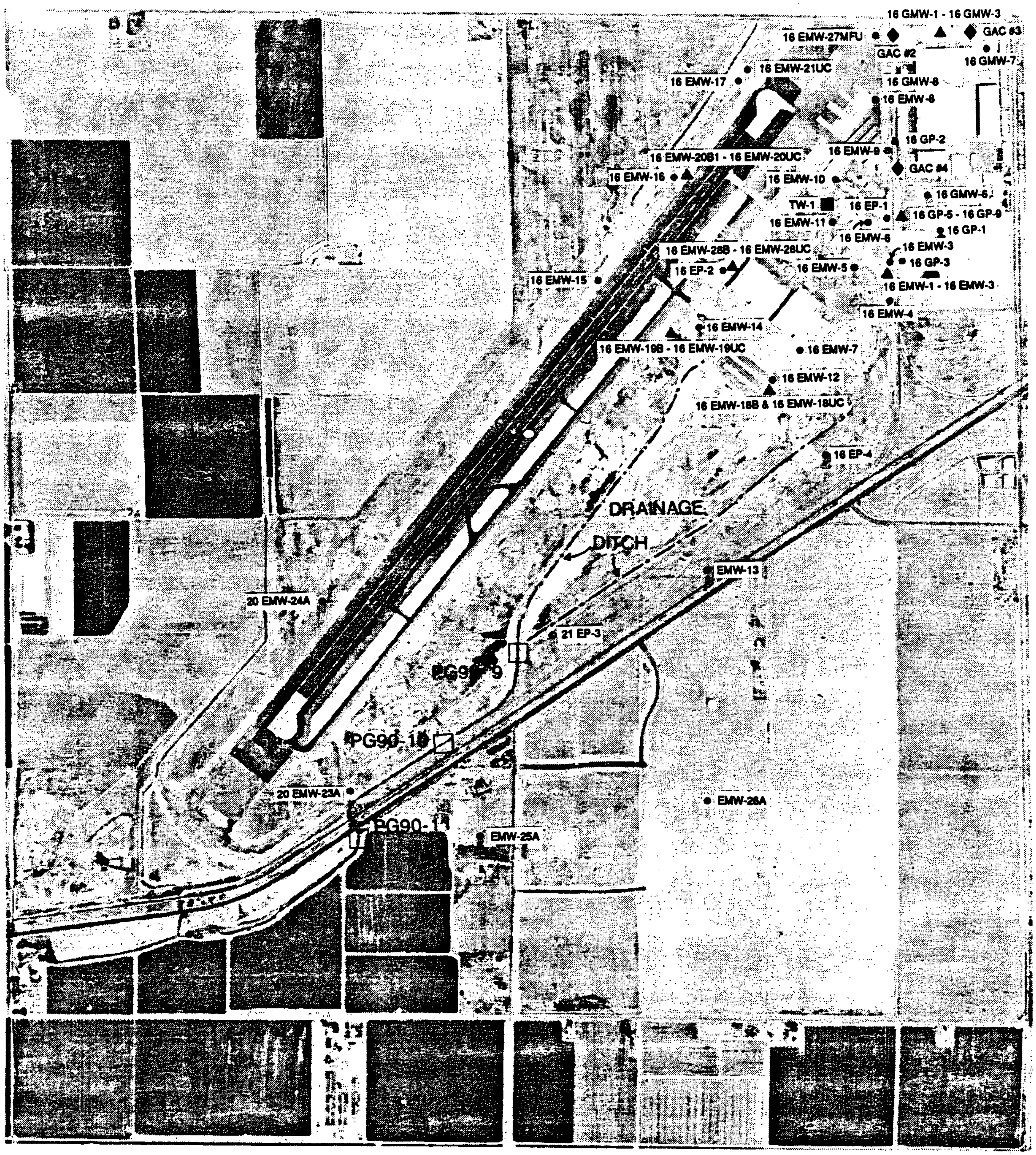

LITCHFIELD NAVAL AIR FACILITIES
SOUTHERN PACIFIC R.R.
PG90-1
PG90-2
PG90-3
PG90-4
PG90-5
PG90-6
PG90-7
PG90-8
0903
0904
0905
0907
0908
0911
0913
0914
GB-2
GB-3
GB-6
YUMA ROAD
LITCHFIELD ROAD
GRAPHIC SCALE IN FEET
PREVIOUS BORINGS
COE PROPOSED BORING LOCATIONS
(locations tentative until approved by LORAL)
GOODYEAR AEROSPACE CORPORATION
GENERAL PLANT SANITARY SEWER PLAN

FIGURE 8



SAMPLE LOCATIONS

SEDIMENT SAMPLING LOCATION MAP

FIGURE 9

APPENDIX F

SAMPLING PLAN ADDENDUM

Addendum to Final Sampling Plan
Phoenix-Goodyear Airport Superfund Project
Soil Gas Sampling Port Installation

Prepared by
U.S. Army Corps of Engineers
Omaha District

2 February 1990

A.1 Intent Paired soil gas sampling ports are to be installed in at least some of the borings to be drilled for soil sampling as described in the 22 January 1990 Sampling Plan. These borings were originally intended to only provide soil samples for chemical analyses; however, EPA, in the 25 January 1990 Project Committee meeting, suggested that some soil gas ports be installed in the borings. In order to comply with EPA wishes, these ports will be installed in as many borings as site conditions will allow. The soil gas analyses are important for establishing a correlation with soil concentrations, especially since the decisions regarding soil clean up will be based on soil gas. The combination of soil and soil gas analyses will hopefully allow better prioritization of soil areas to be cleaned by soil vapor extraction.

A.2 Construction

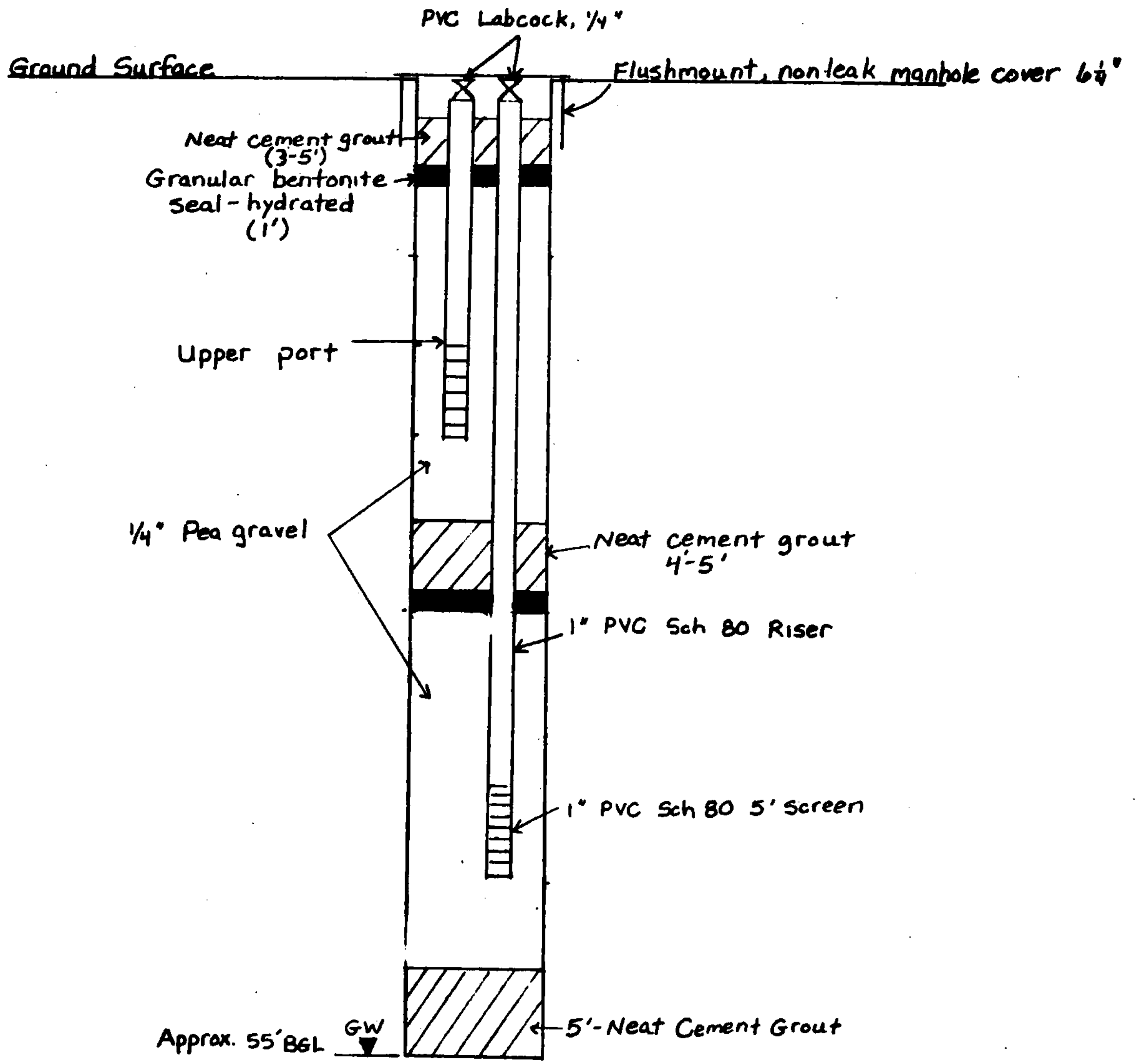
A.2.1. Depth Two soil gas ports will be installed in each borehole. One will be installed in the upper 30 feet of the vadose zone which is rich in silts and clays. The other one will be installed in the lower 25 feet of the unsaturated zone which is significantly more coarse-grained.

A.2.2. Materials The soil gas port riser will be constructed of 1-inch schedule 80 PVC meeting NSF standards for potable water pipe. Screen will consist of the same material and will be factory slotted with approximately 40-slot openings. A sampling hose nipple with stopcock will be attached to the riser by appropriate reducing fittings. Pack material around the screen will be clean, washed pea-gravel. Well seals will consist of a granular bentonite seal, appropriately hydrated with clean water, with a neat cement grout seal above that. The ports will be covered by an 8-inch diameter cast-iron security flush-mount manhole.

A.2.3. Installation See the attached figure for details of port construction. After the boring reaches ground water and the last sample is obtained (including HydroPunch sampling), the bottom 5 feet of the hole will be backfilled with neat cement grout. The lower port riser and screen will then be installed, with the 5 feet of screen vertically centered in the lower, coarse-grained portion of the vadose zone and set on a bed of pea gravel. The screen will have a suitable end cap attached without the use of glues or solvents. The screen will then be surrounded by pea gravel to at least 5 feet of gravel above the top of the screen. A minimum 1-foot thick granular bentonite seal will be placed on top of the pack. The bentonite will be hydrated with clean water. A minimum 4-foot-thick neat cement seal will be placed by tremie pipe above the bentonite. Once the cement is at least partially set up, another pea gravel bed will placed for the upper port. A separate 5-foot screen and riser will be set such that the top of the screen is no shallower than 15 feet. The upper screen will be surrounded by more pea gravel. The pea-gravel will extend at least 10 feet above the top of the screen. Another granular bentonite seal will be placed and suitably hydrated. The remaining portion of the hole will be filled with neat cement grout by tremie pipe. The flush-mount manhole will be set in the grout to grade. Stopcocks will be left open for the duration of the job to help the port reach equilibrium with the subsurface environment.

A.3. Sampling The subsequent sampling of the ports is currently being discussed. If done under the auspices of the Omaha District, it would be done by a contractor such as Tracer Research of Tucson, AZ. The work will done under a separate sampling plan.

SOIL VAPOR MONITORING CONSTRUCTION DIAGRAM



SCALE: 1 inch = 10 feet (all depths approximate)

Attachment 1

APPENDIX G

SITE SAFETY AND HEALTH PLAN

SAFETY, HEALTH, AND EMERGENCY RESPONSE PLAN

Phoenix-Goodyear Airport Field Investigation

Goodyear, Arizona

Prepared for:

U.S. Army Corps of Engineers
Omaha District, Omaha, Nebraska

31 January 1990

1.0 INTRODUCTION

1.1 PLAN OBJECTIVE

This Field Investigation is being performed by U.S. Army Corps of Engineers, Omaha District. The intent of this study is to characterize unsaturated zone soils at the Loral facility (formerly the Goodyear Aerospace facility) at the Phoenix-Goodyear Airport Superfund site. Soils in the facility area have not been adequately investigated, and source areas of contamination are suspected underneath the Loral facility, particularly in the sewer drainage system. This investigation will enable PRP's to effectively negotiate cost allocation for waste remediation, given more complete information regarding extent of waste and source areas of contamination.

This plan describes field implementation of the SHERP, specific responsibilities, training requirements, protective equipment, and operating procedures that have been adapted to meet site-specific requirements, emergency procedures and medical monitoring.

The SHERP has been developed based on the requirements and guidance contained in the following regulations and guidance documents:

Occupational Safety and Health Administration (OSHA) Standards, 29 CFR 1910 and 1926, including 29 CFR 1910.120.

U.S. Environmental Protection Agency (USEPA) "Standard Operating Safety Guides," November, 1984.

NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985.

EM 385-1-1, "Safety and Health Requirements Manual", October 1987.

1.2 SITE DESCRIPTION/SCOPE OF WORK

A. History

The PGA study area covers an area of approximately 35 square miles in Maricopa County in the western part of the Salt River Valley, about 17 miles west of Phoenix, Arizona. The site investigation is limited to area within section 16 (see Sampling and Analytical plan, figure 1). Industrial facilities of the Loral Corporation are within the boundaries of section 16.

Sampling of groundwater and soils adjacent to the Loral facility has indicated TCE, DCE, chromium, and chloroform exceeding federal and ADHS levels. The groundwater plume as indicated by groundwater sampling originates in or near the Loral facility. Historical investigations have indicated that the sewer drainage system beneath the facility may have transported contaminants from the industrial operations to adjacent soils and groundwater. Soil sampling in this area has been limited to outside buildings, and concentrations in these areas has exceeded ADHS cleanup levels. Highest concentration of TCE in groundwater near the facility was at monitoring well GAC#2 at 110 ug/l. Highest concentration of TCE in soils was near Building 1 and 16 at former boring location 903 at 2500 ppb.

B. Scope of Current Investigation

Current remediation is based on contaminant source areas identified in the Remedial Investigation. Cost allocation for the final solution depends on estimates of quantities of soil and groundwater identified in sampling requiring remedial action. Previously unidentified but assumed source areas in the Loral facility may hinder cleanup attempts, allow inaccurate estimates to be made for time period required to remediate, and therefore effect cost allocation. To further allocation negotiations and determine extent of contamination, the current sampling effort has been proposed.

Eight soil borings shall be sampled at the Loral facilities. These locations are shown in the sampling plan in figure 8. One of these boring locations shall be located within building 1 near the degreaser tank. All other borings shall be located outside of the buildings. In addition, three sediment samples shall be collected outside of area 16 in the drainage ditch (see figure 9 in the sampling plan) downgradient from the facilities. The purpose of this sampling is to address data gaps identified in the RI for surface water contaminant fate and transport of contaminants from the site source areas.

1.3 HAZARD ASSESSMENT

A. Chemical Hazards.

The analytical results discussed in the previous section indicated that metals and volatile organic contaminants in the groundwater and soils are the only chemicals that were reported at levels that could present potential inhalation, dermal, or ingestion exposure hazards to workers engaged in drilling and soil sampling activities. Trichloroethylene, 1,1-Dichloroethylene, and chromium have been identified as the indicator chemicals of concern for potential worker exposure. Table 1 provides a summary of exposure limits and physical properties of the primary indicated contaminants.

Table 1

Contaminant	vapor Pressure (mm Hg)	Solubility (%)	TLV	PEL (ppm)	Odor threshold (ppm)	Cartridge Breakthrough (min)[1]
TCE	58	0.1	50	100	50	40
1,1-DCE	180	0.35	5	---	100	23
chromium	---	----	$0.5 mg/m^3$	$0.5 mg/m^3$	---	---

? occurred in the highest concentration on site, and has been selected - the primary contaminant of concern for potential worker exposure for inhalation and dermal contact during the field investigation. Personal protective equipment and engineering controls for this SHERP were selected based on potential hazards associated with TCE exposures.

Toxicity Profiles

TCE

TCE is a colorless, non-flammable solvent primarily used in vapor degreasing. It is very reactive with strong caustics, and with chemically active metals. Exposure to TCE vapor may cause irritation of the eyes, nose and throat. Splashes of liquid to the eyes and skin may cause irritation and damage. Acute exposure to TCE may cause headaches, dizziness, tremors and nausea. Symptoms may be similar to that of alcohol consumption. Alcohol may also have an additive effect for exposure to TCE, by worsening acute exposure symptoms and effects. Chronic exposure has been shown to cause cancer in laboratory animals for respiratory and gastric exposure.

B. Physical Hazards

Activities performed inside building 1 will pose unique potential physical hazards to workers. Overhead beams, electrical lines (460 v), ıs lines, and water lines are approximately 15 to 20 feet above the loor in some locations. Safe clearance of at least 5 feet shall be maintained between these utilities and the mast of the drill rig. The drill rig shall use an additional grounding device when in the proximity of the electrical lines.

Combustion exhaust and releases of airborne contaminants from the borehole, shall be funneled to the exterior of the building by a portable aluminum duct and an industrial fan. The length of the duct shall accommodate the distance to the bay doors from the degreaser area.

Dust generated by drilling through the facility concrete floor shall be abated with the exhaust device and the fan. Care shall be taken to minimize damage to the flooring or any structures in the facility.

All attempts shall be made to minimize interruptions to facility operations; noise, inhalation exposures, and physical proximity to facility worker areas. Generally, it has been documented that noise generated from a drill rig does exceed 85dBA, but that TWA for 8 hours does not exceed 85 dBA. Hearing protection shall be provided to the drill crew and to Loral employees working within 20 ft in the vicinity of the drill rig as an extra precaution against excessive noise levels. Site control measures shall insure that only Corps investigative team are allowed access within the designated exclusion zones.

The investigative team shall also ensure safe distance from the legreaser tank (TCA) during drilling activities. Spark arresting tools nd equipment shall be used for all work inside the building.

Outside the facility, next to the buildings, workers shall insure safe clearance of the drill rig to overhead power lines, hydrants, and cing and structures. Underground utilities shall be located and marked prior to the field investigation.

2.0 RESPONSIBILITIES

The Project Manager, Site Manager, and Health and Safety Officer are responsible for formulating and enforcing health and safety require ments. These responsibilities include:

Assuring that:

- all team members have completed the required medical ex amination and have met the qualification criteria for site work;

- that a site safety meeting with all site personnel is held at prior to initiating work at the site , and that a written record is maintained which notes date, time, attendance, the subjects discussed, and who conducted the meeting;

- that all personnel on site have received site-specific training given by the Health & Safety Coordinator/ or Health and Safety Officer.

- that all site team members have received the required 40-hour health, safety and emergency response training and the annual 8-hour refresher course.

- that all supervisory personnel on site have had 8-hour of site supervisory experience;

- that all equipment, including safety equipment, used on site is suitable and adequate;

- that site standard operating procedures are followed at all times; and,

- Addressing any unusual problems or conditions that may be encountered.

The Site Manager, Mr. Steve Pearson, and site geologist Ms. Penny Brockman have the responsibility as the site supervisors and are required to have 8-hours of previous supervisory experience.

The Project Manager, Mr. Stan Bauer, has overall responsibility for the project .

The Health and Safety Officer, Ms. Penny Brockman and Joe Morrisey, have responsibility for administering the SHERP relative to all site activities, and will be in the field full-time while site activities are in progress. Their shared primary operational responsibilities will be environmental monitoring, including air and soil monitoring.

Health & Safety Coordinator, Sandy Cotter, has responsibility for responding to any nonroutine matters that relate to health, safety, and emergency response during the project life. The Health and Safety Co ordinator provides an independent check on the implementation of the SHERP at the site. The HSC will visit the site to monitor compliance with the provisions of the SHERP. Field Personnel will report directly to the Site Manager.

3.0 TRAINING

A thorough understanding of the types of hazards most likely to be en countered at hazardous waste sites and personal protection measures needed to protect on-site personnel are the first requirements of a complete SHERP. All personnel who have the potential to be exposed to contaminated materials or hazardous conditions, will have completed 40 hours of training prior to entering the work site. The training will meet the requirements of the OSHA standard 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" . Supervisors on site are required to have 8-hours of site supervisory experience.

In addition to the initial training, workers will also complete an annual 8-hour refresher course; a site specific training session con ıcted by the HSC, to familiarize them with site conditions and the ızards specific to the site.

Visitors entering designated work areas will be subject to all appli cable health and safety requirements during field operations at the site. The Site Safety Officer is responsible for briefing the person nel on site and responsible Loral facility management on potential contamination that may be encountered on the site, site safety, and the emergency response plan.

Briefings to update personnel on any changes in protocols, and to out line Standard Operating Procedures will be implemented when initiating activities at the site. These meetings will discuss in detail the hazards specific to the site and tasks to be performed.

4.0 PERSONAL PROTECTIVE EQUIPMENT

A Review of the history and conditions of the site indicate the extent and nature of the hazardous conditions include contaminated soils and groundwater. Based on the information obtained, the primary exposure to workers by hazardous constituents will be through contact with contaminated soil and inhalation of volatile organic vapors. At a minimum, all activities on the site will be performed primarily under Level D personal protection. Provisions are made to further upgrade levels of protection if necessary.

A. Clothing/Respiratory Protection

The following levels of protection are those that may be utilized at the site for proposed field activities. (as shown in Table 2). In the ent of conflicting requirements, the most protective level shall apply.

1. <u>Level D</u>

   - safety glasses
   - hard hat
   - work clothing as prescribed by weather
   - Steel toed work boots

2. <u>Modified Level D</u>

   - Safety glasses/goggles
   - Hard Hat
   - steel toe work boots
   - nitrile or neoprene overboots
   - inner latex gloves
   - outer nitrile or neoprene gloves
   - Tyvek disposable coverall

3. <u>Level C</u>

   - Full-face, air-purifying respirator, with cartridges for organic vapors, dusts and mists.
   - Tyvek coveralls
   - Nitrile or neoprene gloves, with latex liners
   - Neoprene or nitrile rubber boots,
   - Disposable outer boots (optional)
   - Hard hats
   - Steel toe work boots

Table 2

Work Activity	Level of Protection*

.illing	Modified Level D
Soil Sampling	Level D/Modified Level D**
Sediment sampling	Level D
Decontamination	Level D/Modified Level D**

*Upgrades/Downgrades will be dictated by real-time air monitoring re sults. (See section 5.0).

**Workers will don dermal protection/Gloves, boots, and Tyveks for tasks with splash potential.

B. Hearing Protection

Hearing protection devices shall be provided to the investigative team, and to Loral facility employees working in the vicinity of the drill rig. Control of noise levels shall be coordinated with the Loral facility management.

.0 MONITORING

The primary health and safety concerns during field activities are physical contact with contaminated soil and the inhalation of vapors. Frequent photoionization detector (PID) measurements will be conducted with a HNu, equipped with a 10.2 and/or 11.7 eV lamp, will be calibrated each day (beginning, during lunch, at end of work day) using 100 ppm isobutylene calibration gas. The instrument, for each location shall be zeroed for background levels of organic vapors. Based upon the initial site inspection, respirators will not be worn on these sites, but respiratory protection equipment will be readily available onsite in the event that an upgrade to Level C protection becomes necessary. If breathing zone readings indicate detectable levels of volatile organics greater than 25 ppm above background levels, based on the REL for TCE work will be stopped and Level C protection will be implemented. The action levels for personal protection upgrades/downgrades are given as follows:

PID READINGS IN THE BREATHING ZONE	ACTION
0-25 ppm above background	Level D/Modified D
25-1000 ppm above background	Level C, notify facility management for operations inside building 1.
>1000 ppm above background	Stop work, evacuate

site immediately and, notify
USACE and facility management.

Monitoring will be performed continuously during soil borings and sampling in the employee breathing zone and the perimeter of the work zone for any task with the potential for inhalation exposure. Levels exceeding 25 ppm on the perimeter of the work zone inside the building will require notification of facility management for coordination of action to be taken . Contaminant levels exceeding 1000 ppm in any area will require evacuation of the work zone and notification of facility management and USACE HSC for coordination and instructions.

Monitoring at the ground level during soil borings will also be performed to determine if explosive conditions could develop. The explosive limits for TCE are given as follows:

Lower Explosive Limit	Upper Explosive Limit	20% of the LEL
11 % or 110,000 ppm	41 % or 410,000 ppm	22000 ppm

Levels at or above 20% of the Lower Explosive Limit, or 22,000 ppm (2000 ppm is the limit for the HNu) at the well opening will require workers to evacuate the area. However, by evacuating the area at 1000-2000 ppm, orkers shall ensure limited exposure to explosive conditions. If concentrations exceed 1000 ppm at boreholes, workers shall notify the facility management and the HSC.

6.0 WORK ZONES

Work zones are designed to prevent employees, visitors, and the sur rounding environment from exposure to contamination during all aspects of site investigative activities. All work zones and support areas will be established by the Site Manager. Movement of personnel and equip ment between zones on and off site will be controlled by means of des ignated access points. Minimum personal protective equipment for work in each zone is described in Table 2.

6.1 Exclusion Zone

The Exclusion Zone is the suspected area of greatest environmental con tamination and presents the greatest potential for worker exposure.
The Exclusion Zone will be designated as an are within a 50 foot radius of each boring area. Personnel entering the area must wear the mandated level of protection for that area, and have the required training to enter the area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone, as described in section 4.0. Inside the building the work zone shall encompass a 50 ft diameter area, and shall be clearly marked with caution tape or roped off. Outside the building near the fence area, fencing shall be removed to accommodate the drill rig. A Loral security guard shall be present during all activities in this area, to ensure facility security.

6.2 Contamination Reduction Zone

Contamination Reduction Zone serves as a transition area between the Exclusion Zone and Support Zone. Any personal Decontamination facilities are located in the Contamination Reduction Zone. Inside building, washrooms are available for cleaning small equipment and personal decontamination. The equipment decontamination area shall be located at the facility washrack.

6.3 Support Zone

The Support Zone serves as a clean, control area. Operational Support facilities are located within the Support Zone. Zone boundaries and implementation will be enforced at all times.

7.0 ACCIDENT PREVENTION AND SITE CONTROL

The following items are requirements to protect the health and safety of field workers and will be discussed in the safety briefing prior to initiating work on the site.

a. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the Exclusion and Contamination Reduction Zones.

b. Hands and face must be washed upon leaving the Exclusion Zone and before eating, drinking, chewing gum or tobacco and smoking or other activities which may result in ingestion of contamination.

c. A buddy system will be used. Hand signals will be established to maintain communication.

d. During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance. All personnel will be aware of dangerous situations that may develop.

e. Visual contact will be maintained between buddies on site when performing hazardous duties.

f. No personnel will be admitted to the site without the proper safety equipment and training.

g. All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the Health and Safety Officer or the Project Manager, will be immediately dismissed from the site.

h. Proper decontamination procedures must be followed before leaving the site.

8 0 MEDICAL SURVEILLANCE

All personnel with a potential to be exposed to hazardous substances at or above the established permissible exposure limits, for 30 or more days a year shall be inducted into a medical surveillance program, as directed in 29 CFR 1910.120. All Corps personnel on site should al ready be enrolled in the Corps Medical Surveillance program, and should furnish the Project Manager with certification from the Health Unit as to their fitness to perform field work.

Personnel will obtain more frequent monitoring in the event of overex posure to a hazardous substance, or if medically necessary as deter mined by the Corps physician.

9.0 DECONTAMINATION

All personnel must complete appropriate decontamination procedures prior to leaving the site in a manner that is responsive to actual site conditions. A personal decontamination area will be set up at the Contamination Reduction Zone for activities occurring outside buildings. Receptacles will be provided for all disposable clothing. Inside the building, personnel shall decon using the facility washrooms.

Wash tubs containing a detergent-water solution or appropriate decon solution (Alconox) and soft-bristle brushes will be used to decon taminate reusable equipment outside the facility buildings, near each work zone. Clean, potable water will be used for the final rinsing.

Each individual shall conduct proper personal hygiene which may include washing any exposed skin prior to eating, smoking, or leaving the site. All employees will shower immediately after concluding field activities for the day.

The Drill rig and sampling equipment shall be decontaminated, using an appropriate decon solution (Alconox) and clean, potable water at the facility washrack.

Drill cuttings, refuse, and decontamination solution will be drummed up on site and transported to the airport facility.

10.0 EMERGENCY EQUIPMENT AND RESPONSE

To minimize the impact of an emergency, the following equipment shall be on site:

- First Aid Kit
- Portable Eye Wash, 5 gallon capacity, 15 minute duration
- Two fire extinguishers

For physical injuries, first aid treatment shall be given at the site by someone trained in first aid, depending upon the seriousness of the injury. The victim should undergo decontamination. If necessary, un less such procedures interfere with necessary treatment. There shall be at least one person on site at all times trained in CPR/First Aide.

In life-threatening situations, care shall be instituted immediately. Protective clothing shall be removed or cut away if this will not cause delays, interfere with treatment, or aggravate the problem. If con taminated protective clothing cannot be removed, wrap the victim in clean materials to help prevent contamination of medical personnel and ambulances. Medical assistance should be obtained as quickly as is practical.

In the event of personal injury:

1. Notify the Site Manager and facility management of the incident.

2. Administer First Aid.

3. Transport the victim to the nearest hospital or emergency medical center or call for ambulance transport, as appropriate.

Notify the Corps Project Manager and describe the nature of the .ncident and response procedures, and provide contact information to facilitate interaction between the Corps Project Manager and the local attending physician.

5. Notify the Corps Health and Safety Officer of the incident and de scribe the emergency response actions taken.

The potential for fire or explosion exists anytime powered equipment is used. All motors shall be stopped prior to re-fueling, and a minimum 2-20 lb. ABC rated dry chemical fire extinguishers shall be present at all times.

In the event of a fire or explosion:

1. Immediately evacuate all personnel and leave the area, and notify Corps HSC and facility management.

2. Administer first aid as appropriate,

3. Notify emergency services,

10.1 Emergency Medical Response Information

The appropriate contact(s) from the following list shall be made for ıll emergency situations. Telephones will be located near the site prior to initiating field activities. All personnel will be informed on the location of the telephones and emergency numbers shall be posted in the support zone in a prominent place.

Prior to project start-up, the project manager shall notify the emergency services, to inform them of the nature of field activities and the potential for hazardous conditions to develop on site.

Emergency Service		Telephone
Ambulance		
	Glendale	602-931-5700
	Maryville Samaritan Hospital	602-848-5000
Fire Department		
	City of Goodyear	602-932-3050
	Airport	602-273-3455

Project Manager

Stan Bauer 402-221-7808

Health and Safety Coordinator

Sandy Cotter 402-221-7863

Figure 1 shows the route to the Maryville Samaritan Hospital.

11.0 LOGS, ACCIDENT REPORTS, AND RECORDKEEPING

The Site Manager will maintain logs and reports covering all health and safety aspects of the project throughout the duration of work activities. These reports include a daily log, and accident reports.

11.1 Daily Logs

Daily logs will be kept by the Site Manager to summarize daily events that occur throughout the duration of the project. Topics in the daily log report include:

- Health and Safety discrepancies encountered;

- Visitors to the site

11.2 Accident Reporting

Accidents will be reported on the daily log and the forms provided in appendix A as directed by DM 385-1-1.

APPENDIX A

UNITED STATES ARMY CORPS OF ENGINEERS
ACCIDENT INVESTIGATION REPORT

(USACE SUPPL 1 to AR 385-40)

REQUIREMENTS CONTROL SYMBOL (DAEN-SO-8 (R2))

NOTE: SPACES, BELOW, DEFINED BY HEAVY LINES ARE FOR "SAFETY CENTER USE ONLY."

1. UNIT IDENTIFICATION — a. UIC; b. DESCRIPTION

2. TIME AND DATE OF ACCIDENT — a. YEAR; b. MONTH; c. DAY; d. HOUR

3. TIME OF DAY (Check one) — ☐a. DAWN ☐b. DAY ☐c. DUSK ☐d. NIGHT

4. LOCATION — ☐a. ON-POST ☐b. OFF-POST

5. EXACT LOCATION OF ACCIDENT

SECTION A – PERSONNEL INVOLVED

6. NAME (Last - First - MI)

7. ADDRESS (Use official address for all Government personnel)

8. SOCIAL SECURITY NUMBER

9. GRADE

10. AGE

11. SEX — ☐a. MALE ☐b. FEMALE

12. MOS OR CIVILIAN JOB SERIES

13. FLIGHT STATUS — ☐a. YES ☐b. NO

14. DUTY STATUS — ☐a. ON DUTY ☐b. OFF DUTY

15. NO. OF HOURS ON CONTINUOUS DUTY BEFORE ACCIDENT

16. NO. OF HOURS SLEEP IN LAST 24 HOURS (if hours on duty more than 8)

17. CLASSIFICATION AT TIME OF ACCIDENT (Check appropriate box)

☐a. ACTIVE ARMY ☐b. ARMY CIVILIAN ☐c. ARMY CONTRACTOR ☐d. NONAPPROPRIATED FUND ☐e. OTHER US MILITARY ☐f. ROTC ☐g. DEPENDENT

NATIONAL GUARD: ☐h. TECH ☐i. IDT ☐j. AT ☐k. FTTD ☐l. FTM ☐m. ADT

ARMY RESERVE: ☐n. IDT ☐o. AT ☐p. ADT ☐q. FTM

FOREIGN NATIONAL: ☐r. DIRECT HIRE ☐s. CONTRACT HIRE ☐t. KATUSA

☐u. OTHER (Specify)

18. PERSON'S ACTIVITY/TASK AT TIME OF ACCIDENT

19. IF THIS PERSON'S ACTIVITY WAS NECESSARY PART OF TRAINING, GIVE TYPE

☐a. BASIC (School) ☐b. ADVANCED (School) ☐c. OJT (Unit) ☐d. PROFICIENCY (Unit) ☐e. OTHER (Specify)

20. WAS THIS PERSON'S ACTIVITY PART OF FIELD EXERCISE? ☐a. YES ☐b. NO

21. WAS THIS PERSON'S ACTIVITY PART OF TACTICAL TRAINING? ☐a. YES ☐b. NO

22. OPERATIONAL CATEGORY (Identify operational category that best describes the overall mission at time of accident.)

23. SEVERITY OF INJURY TO THIS PERSON (Check only one)

☐a. FATAL ☐b. PERMANENT TOTAL DISABILITY ☐c. PERMANENT PARTIAL DISABILITY ☐d. LOST WORKDAY CASE – DAYS AWAY FROM WORK ☐e. LOST WORKDAY CASE – RESTRICTED WORK ACTIVITY ☐f. NONFATAL CASE WITHOUT LOST WORKDAYS ☐g. FIRST AID ONLY ☐h. NO INJURY ☐i. MISSING AND PRESUMED DEAD

24. WORKDAYS LOST (estimate)

25. WORKDAYS RESTRICTED (estimate)

26. TYPE/NATURE OF INJURY/OCCUPATIONAL ILLNESS

27. BODY PART AFFECTED

28. CAUSE OF INJURY/OCCUPATIONAL ILLNESS

29. VEHICLE RESTRAINT SYSTEM — ☐a. USED ☐b. NOT AVAILABLE ☐c. NOT APPLICABLE ☐d. AVAILABLE BUT NOT USED

30. THIS PERSON'S ERRORS WHICH CAUSED OR CONTRIBUTED TO THE ACCIDENT (Describe each mistake and the result)

ENG FORM 3394, MAY 81
Exception to DA Forms 285 and 285-1 approved by HQDA, Mar 81.

EDITION OF JAN 78 IS OBSOLETE. REPLACES ENG FORM 3394-1, JAN 78 WHICH IS OBSOLETE.

(Proponent: DAEN-SO)

APPENDIX H

DRILL CUTTINGS DISPOSAL/ ANALYTICAL RESULTS

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF

10 May 1990

Geology Section

Mr. Craig Cooper
70 Yosemite Avenue, #102
Oakland, California 94611

Dear Mr. Cooper:

As you are aware the Corps of Engineers currently have containerized drill cuttings stored at the Phoenix Goodyear Airport. These cuttings were generated during fieldwork in February of this year at the Loral Defense Systems facility. Mr. Ed Kucharski is anxious to have these drums relocated to make room for scheduled construction activities in the drum storage area.

The analytical results for these borings are attached. No contaminants were detected in soil samples from borings PG90-2, 3, 7 and 8. In boring PG90-5 less than 1 mg/kg of TCE was detected in the split-spoon sample taken at a depth of 55 feet. This was the last sample drive from the boring, obtained from below the augers in the saturated zone. No drill cuttings from this depth were brought to the surface. Based on the analytical results we would like to spread the drill cuttings from borings PG90-2, 3, 5, 7 and 8 at the airport, with Mr. Kucharski's permission.

Higher levels of TCE were detected in boring PG90-4. At a depth of 25 feet TCE was detected at levels up to 6.6 mg/kg from split-spoon samples. The cuttings were containerized, but in the process of drilling and handling of the cuttings a significant portion of the volatile organics has probably volatilized. We propose to collect VOA samples from each of the two barrels containing soils from this boring to determine if any detectable levels of volatile organics remain. While awaiting results we would like to move the drums to another location of your choice at the airport. According to RCRA, the limited quantities of contaminated material qualifies us as a small-quantity operation and gives us 6 months to dispose of the waste. If detectable levels are found we will have these two barrels transported to a hazardous waste facility for proper disposal. If no detectable levels are found we will arrange to spread these soils in the same manner as the soils from the other borings.

We would like to schedule the drum sampling and spreading of clean cuttings between May 18-22, 1990. Mr. Kucharski has agreed in principle to this approach. Please contact me at (402)221-4494 or Steve Pearson at (402)221-4418 if you have any problems with this proposal.

Sincerely,

David J. Becker
Chief, Geology Section
Geotechnical Branch

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF

10 May 1990

Geology Section

Mr. Ed Kucharski
Phoenix Goodyear Airport
1658 South Litchfield Road
Goodyear, Arizona 85338

Dear Mr. Kucharski:

As you are aware the Corps of Engineers currently have containerized drill cuttings stored at the Phoenix Goodyear Airport. These cuttings were generated during fieldwork in February.

The analytical results for these borings are attached. No contaminants were detected in soil samples from borings PG90-2, 3, 7 and 8. In boring PG90-5 less than 1 mg/kg of TCE was detected in the split-spoon sample taken at a depth of 55 feet. This was the last sample drive from the boring, obtained from below the augers in the saturated zone. No drill cuttings from this depth were brought to the surface. Based on the analytical results we would like to spread the drill cuttings from borings PG90-2, 3, 5, 7 and 8 at the airport, at a location of your staff's choosing.

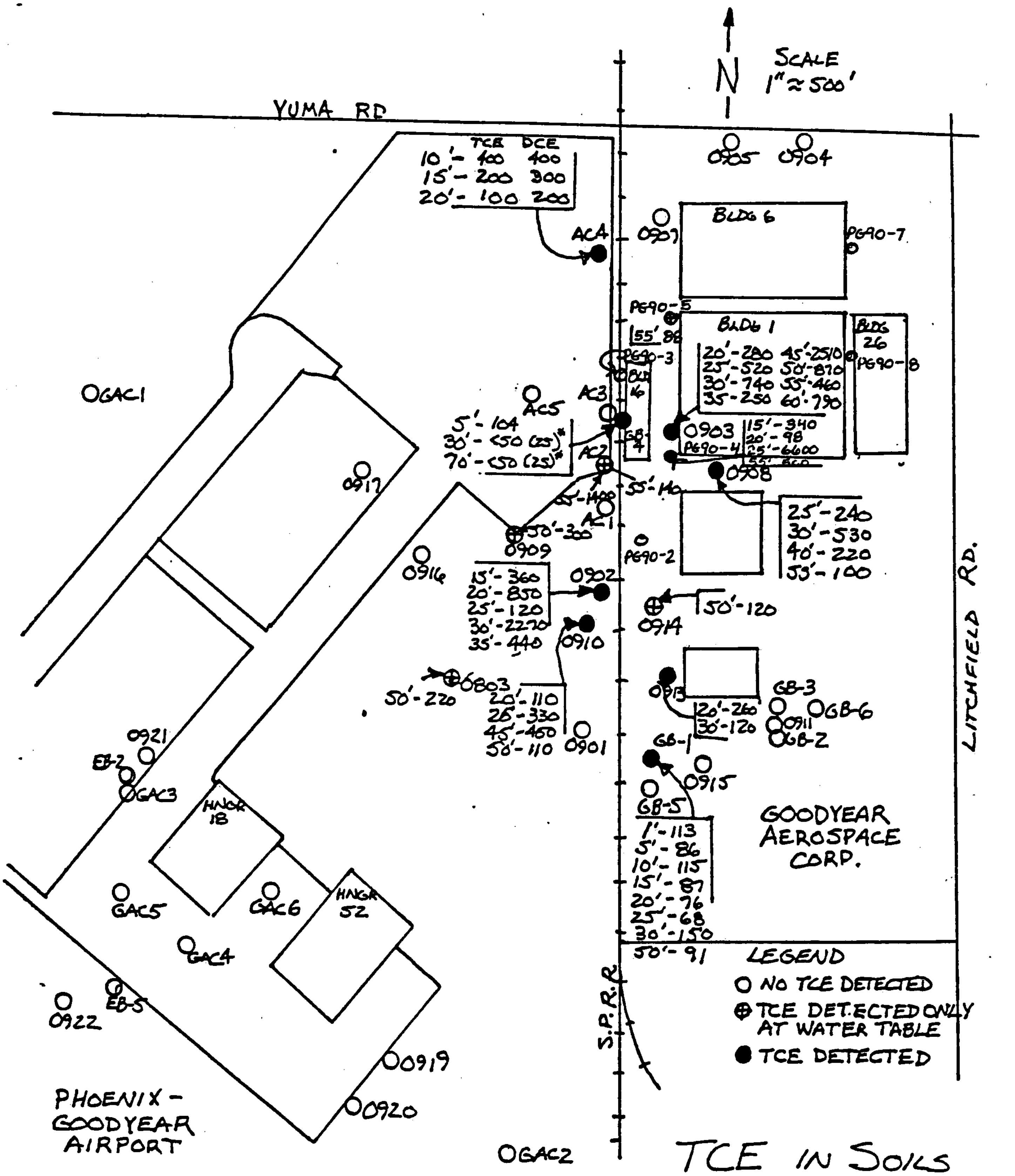
Higher levels of TCE were detected in boring PG90-4. At a depth of 25 feet TCE was detected at levels up to 6.6 mg/kg from split-spoon samples. The cuttings were containerized, but in the process of drilling and handling of the cuttings a significant portion of the volatile organics has probably volatilized. We propose to collect VOA samples from each of the two barrels containing soils from this boring to determine if any detectable levels of volatile organics remain. While awaiting results we would like to move the drums to another location of your choice at the airport. According to RCRA, the limited quantities of contaminated material qualifies us as a small-quantity operation and gives us 6 months to dispose of the waste. If detectable levels are found we will have these two barrels transported to a hazardous waste facility for proper disposal. If no detectable levels are found we will arrange to spread these soils in the same manner as the soils from the other borings.

We would like to schedule the drum sampling and spreading of clean cuttings between May 18-22, 1990. Craig Cooper of the Environmental Protection Agency has agreed in principle to this approach. Please contact me at (402)221-4494 or Steve Pearson at (402)221-4418 if you have any problems with this proposal.

Sincerely,

David J. Becker

David J. Becker
Chief, Geology Section
Geotechnical Branch



OEB-4

TCE CONCENTRATIONS IN PPB.
ONLY SAMPLES DETECTING TCE ARE SHOWN.

Note: only GC results shown for

PHOENIX-GOODYEAR AIRPORT

Volatile Organic Results - Summary Table

DRAFT

PGA Sample ID	Result(#) (wet weight)	Date Analyzed	MRD Lab Number
SB-002-05	BDL	02/09/90	900209-001
SB-002-10	BDL	02/09/90	900209-002
SB-002-15	BDL	02/09/90	900209-003
SB-002-20	BDL	02/09/90	900209-004
SB-002-25	BDL	02/09/90	900209-006
SB-002-30	BDL	02/09/90	900209-007
SB-002-35	BDL	02/09/90	900209-008
SB-002-40	BDL	02/09/90	900209-009
SB-002-45	BDL	02/13/90	900209-010
SB-002-50	BDL	02/10/90	900209-014
SB-002-55	BDL	02/12/90	900209-015
SB-002-55-QA	A	02/16/90	900209-016
SB-003-05	BDL	02/12/90	900210-001
SB-003-10	BDL	02/12/90	900210-002
SB-003-15	BDL	02/12/90	900210-004
SB-003-20	BDL	02/12/90	900210-005
SB-003-20-QC	BDL	02/12/90	900210-006
SB-003-25	BDL	02/12/90	900210-007
SB-003-25-QA	B	02/16/90	900210-008
SB-003-30	BDL	02/12/90	900210-009
SB-003-35	BDL	02/12/90	900210-013
SB-003-40	BDL	02/12/90	900210-014
SB-003-45	BDL	02/13/90	900210-015
SB-003-50	BDL	02/13/90	900210-016
SB-003-55	BDL	02/13/90	900210-017
SB-004-05	BDL	02/14/90	900214-022
SB-004-10	BDL	02/14/90	900214-023
SB-004-15	340	02/14/90	900214-025
SB-004-20	55 *	02/14/90	900214-026
SB-004-20-QC	98 *	02/14/90	900214-027
SB-004-25	3900 +	02/14/90	900214-028
SB-004-25(Lab Dup)	6600 +	02/15/90	900214-028
SB-004-25-QA	C	02/23/90	900214-029
SB-004-30	BDL	02/14/90	900214-030
SB-004-35	BDL	02/14/90	900214-034
SB-004-40	BDL	02/15/90	900214-035
SB-004-45	BDL	02/15/90	900214-036
SB-004-50	BDL	02/15/90	900214-037
SB-004-55	500 +	02/15/90	900214-038
SB-004-55(Lab Dup)	91 * +	02/21/90	900214-038

PHOENIX-GOODYEAR AIRPORT

Volatile Organic Results - Summary Table

DRAFT

PGA Sample ID	Result (wet weight)	Date Analyzed	MRD Lab Number
SB-005-05	BDL	02/16/90	900216-026
SB-005-10	BDL	02/16/90	900216-027
SB-005-15	BDL	02/16/90	900216-029
SB-005-20	BDL	02/16/90	900216-030
SB-005-20-QC	BDL	02/16/90	900216-031
SB-005-25	BDL	02/16/90	900216-032
SB-005-25-QA	BDL	03/01/90	900216-033
SB-005-30	BDL	02/16/90	900216-034
SB-005-35	BDL	02/16/90	900216-038
SB-005-40	BDL	02/16/90	900216-039
SB-005-45	BDL	02/19/90	900216-040
SB-005-50	BDL	02/16/90	900216-041
SB-005-55	68/88 * +	02/16/90	900216-042
SB-005-55(Lab Dup)	71/62 * +	02/23/90	900216-042
SB-008-05	BDL	02/19/90	900220-004
SB-008-10	BDL	02/19/90	900220-005
SB-008-15	BDL	02/19/90	900220-007
SB-008-20	BDL	02/19/90	900220-008
SB-008-20-QC	BDL	02/19/90	900220-009
SB-008-25	BDL	02/19/90	900220-010
SB-008-25-QA	BDL	03/01/90	900220-011
SB-008-30	BDL	02/19/90	900220-012
SB-008-35	BDL	02/19/90	900220-016
SB-008-40	BDL	02/21/90	900220-017
SB-008-45	BDL	02/21/90	900220-018
SB-008-50	BDL	02/21/90	900220-019
SB-008-55	BDL	02/21/90	900220-020
SB-007-05	BDL	02/21/90	900221-007
SB-007-10	BDL	02/21/90	900221-008
SB-007-15	BDL	02/21/90	900221-010
SB-007-20	BDL	02/21/90	900221-011
SB-007-20-QC	BDL	02/22/90	900221-012
SB-007-25	BDL	02/22/90	900221-013
SB-007-25-QA	BDL	02/23/90	900221-014
SB-007-30	BDL	02/22/90	900221-015
SB-007-35	BDL	02/22/90	900221-019
SB-007-40	BDL	02/22/90	900221-020
SB-007-45	BDL	02/22/90	900221-021
SB-007-50	BDL	02/22/90	900221-022
SB-007-55	BDL	02/22/90	900221-023

DRAFT

PHOENIX-GOODYEAR AIRPORT

Volatile Organic Results - Summary Table Definitions

BDL: Below Detection Limit (practical quantitation limit). Units = ug/kg.

#: Only Trichloroethene (TCE) was present in these samples. The lowest practical quantitation limit for TCE is approximately 200-ug/kg wet weight. The practical quantitation limit for most of the other chlorinated and aromatic analytes is about 500-ug/kg wet weight. For the more water soluble analytes, (acetone, 2-butanone, etc.), the practical quantitaion limit is about 3000-ug/kg wet weight. As requested by Steve Pearson (CEMRO-ED-GC) and Kevin Coats (CEMRD-ED-GC), the lowest possible detection limit for TCE is to be reported since it is the most likely contaminate to be found on the site. This lower limit (200 ppb vs. 500 ppb) for TCE required a time consuming and extensive data review and verification. Reporting lower detection limits for all analytes is not practical due to the number of samples analyzed, (in a relatively short time period), and amount of time needed to conduct the proper data review.

All method Quality Control parameters, (blanks, matrix spikes, matrix spike duplicates and surrogate standard recoveries), were within Contract Laboratory Program acceptance criteria. No problems were encountered when analyzing these samples.

*: Below the lowest practical quanitation limit. These values reported are "estimations" only and are to be used only to show that TCE appears to be present, but at very low levels.

+: Both bottles used in sample preparation to verify the presence of TCE. Since both bottles appear to contain TCE, the contaminate appears to be from the site, not laboratory introduced.

A: Low level analysis from SW-846, method 8240 was used by the QA laboratory, whereas the medium level analysis procedure was used by the Contract laboratory. The QA lab reported trace levels of benzene (47), toluene (22), ethylbenzene (92) and 1,2-dichloroethene (27-μg/kg) in this sample which is an order of magnitude below the detection limits set by the contract laboratory.

B: QA laboratory reported 38-μg/kg toluene in this sample.

DRAFT

PHOENIX-GOODYEAR AIRPORT

Volatile Organic Results - Summary Table Definitions

C: QA laboratory reported Below Detection Limit for all volatile organics in this sample (also analyzed in duplicate). One possible explanation could be a sample mix-up most likely to have occurred in the field.

David E. Splichal

David E. Splichal
MRD Laboratory, GC/MS Chemist
402-444-4318

Revised 05/10/90

PEARSON

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF

9 July 1990

Environmental Branch

Mr. Craig Cooper
EPA Region IX (H-7-2)
1235 Mission Street
San Francisco, CA 94103

Dear Mr. Cooper:

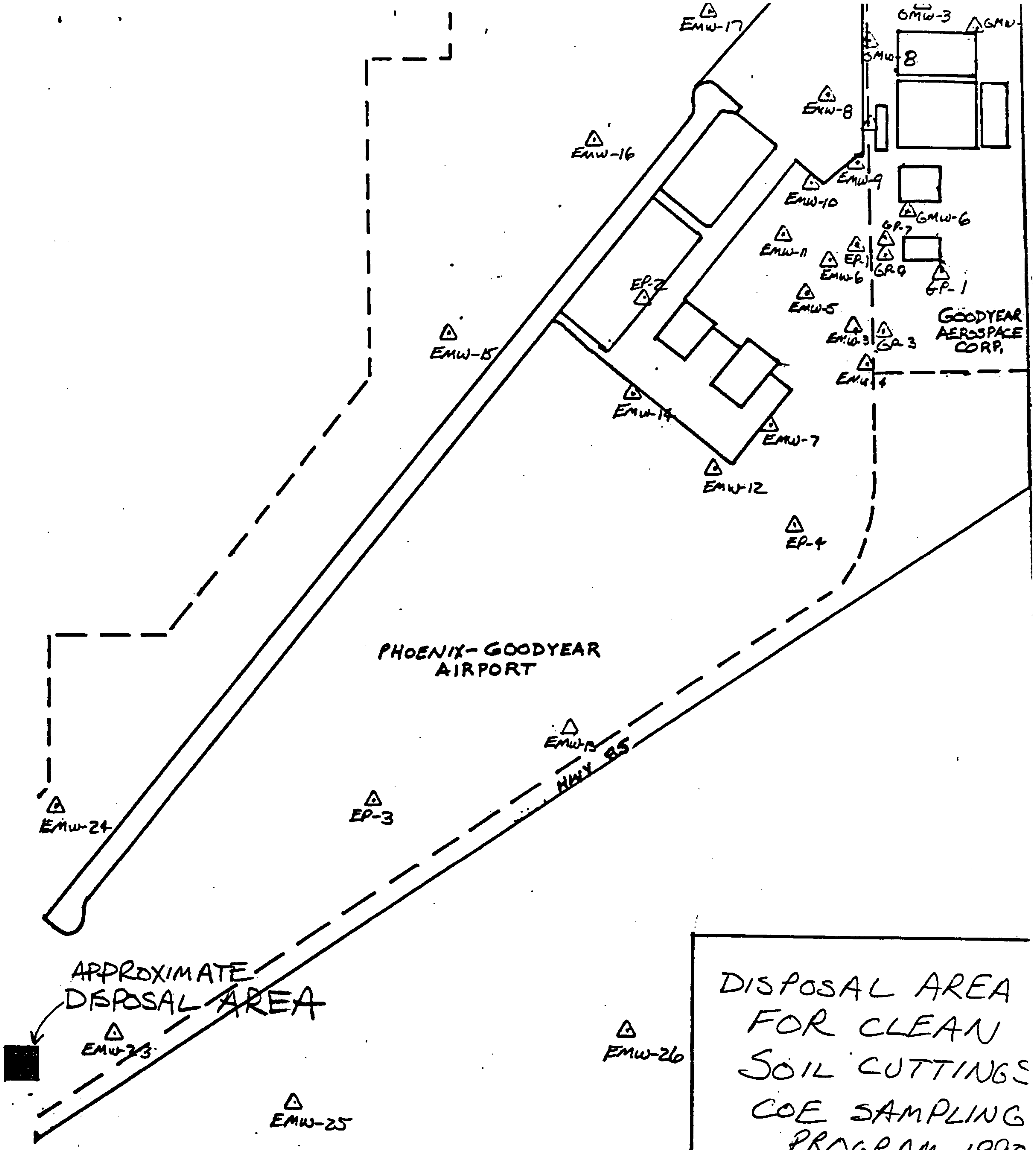
As was previously proposed to you, drums of clean soil (as determined by the analytical results for discrete downhole samples) generated by our drilling and sampling program conducted in February 1990 at the LORAL portion of the PGA were disposed of on May 19, 1990. The approximate disposal location is shown on the enclosed map and was chosen in accordance with airport wishes. In addition, at the time of the clean soil disposal, samples were obtained of the drummed cuttings from boring PG90-4. This boring had yielded discrete downhole samples with detectable TCE concentrations. These three drums of cuttings were not disposed of with the other cuttings but were moved to a temporary storage location identified by the airport pending the results of the drum sampling.

Results of the analyses on these PG90-4 cuttings were received on June 25, 1990 and indicated that the cuttings themselves did not have detectable levels of VOCs, presumably because of volatilization of TCE during handling and drumming of the cuttings. A copy of the results is enclosed. Based on these results the three drums were disposed of in the same general location shown on the attached map on June 26, 1990. This disposal was also done in accordance with the airport wishes. If you have any questions contact David Becker at (402)221-4494 or you may contact Stan Bauer at (402)221-7808.

Sincerely,

Enclosure

S. L. Carlock, P.E.
Chief, Environmental Branch



DISPOSAL AREA FOR CLEAN SOIL CUTTINGS COE SAMPLING PROGRAM, 1990

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
VOLATILE ORGANIC ANALYSIS

CUSTOMER NAME:	U.S. ARMY CORPS OF ENGINEERS - DR. JOE SOLSKY		
SAMPLE SOURCE:	Phoenix-Goodyear Airport (Barrel No. 1)		
WORK ORDER NO.:	805	PROJECT NO.:	11564
DATE EXTRACTED:	N/A	DATE ANALYZED:	05-25-90
SAMPLE TYPE:	Soil Sample	SAMPLE WEIGHT:	1.00
ANALYST:	J. Tebler	PERCENT SOLIDS:	97.00
CUSTOMER SAMPLE NO.:	900522-001	EHRT SAMPLE NO.:	24758
LAB NOTEBOOK NO.:	123, Pg. 68	METHOD NO.:	EPA 8240

	COMPOUNDS			RESULT ug/kg
1.	Chloromethane	-	<	2.58
2.	Bromomethane	-	<	2.58
3.	Vinyl Chloride	-	<	2.58
4.	Chloroethane	-	<	2.58
5.	Methylene Chloride	-	<	5.15
6.	Acetone	-	<	5.15
7.	Carbon Disulfide	-	<	2.58
8.	1,1-Dichloroethene	-	<	2.58
9.	1,1-Dichloroethane	-	<	2.58
10.	1,2-Dichloroethene	-	<	2.58
11.	Chloroform	-	<	2.58
12.	1,2-Dichloroethane	-	<	2.58
13.	2-Butanone	-	<	10.31
14.	1,1,1,-Trichloroethane	-	<	2.58
15.	Carbon Tetrachloride	-	<	2.58
16.	Vinyl Acetate	-	<	5.15
17.	Bromodichloromethane	-	<	2.58
18.	1,2-Dichloropropane	-	<	2.58
19.	cis-1,3-Dichloropropene	-	<	2.58
20.	Trichloroethene	-	<	2.58
21.	Dibromochloromethane	-	<	2.58
22.	1,1,2-Trichloroethane	-	<	2.58
23.	Benzene	-	<	2.58
24.	trans-1,3-Dichloropropene	-	<	2.58
25.	Bromoform	-	<	2.58

CUSTOMER SAMPLE NO.: 900522-001 EHRT SAMPLE NO.: 24758

26.	4-Methyl-2-Pentanone	-	<	10.31
27.	2-Hexanone	-	<	2.58
28.	Tetrachloroethene	-	<	2.58
29.	1,1,2,2-Tetrachloroethane	-	<	2.58
30.	Toluene	-	<	2.58
31.	Chlorobenzene	-	<	2.58
32.	Ethylbenzene	-	<	2.58
33.	Styrene	-	<	2.58
34.	Xylene	-	<	2.58

SURROGATE STANDARDS - % RECOVERIES

1,2-Dichloroethane-d4	-	109%
Toluene-d8	-	95%
Bromofluorobenzene	-	113%

QUALITY CONTROL OFFICER: ____________________

DATE: ____________

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
VOLATILE ORGANIC ANALYSIS

CUSTOMER NAME:	U.S. ARMY CORPS OF ENGINEERS - DR. JOE SOLSKY		
SAMPLE SOURCE:	Phoenix-Goodyear Airport (Barrel No. 2)		
WORK ORDER NO.:	805	PROJECT NO.:	11564
DATE EXTRACTED:	N/A	DATE ANALYZED:	05-25-90
SAMPLE TYPE:	Soil Sample	SAMPLE WEIGHT:	1.00
ANALYST:	J. Tobler	PECENT SOLIDS:	94.00
CUSTOMER SAMPLE NO.:	900522-002	EHRT SAMPLE NO.:	24759
LAB NOTEBOOK NO.:	123, Pg. 68	METHOD NO.:	EPA 8240

	COMPOUNDS			RESULT ug/kg
1.	Chloromethane	-	<	2.66
2.	Bromomethane	-	<	2.66
3.	Vinyl Chloride	-	<	2.66
4.	Chloroethane	-	<	2.66
5.	Methylene Chloride	-	<	5.32
6.	Acetone	-	<	5.32
7.	Carbon Disulfide	-	<	2.66
8.	1,1-Dichloroethene	-	<	2.66
9.	1,1-Dichloroethane	-	<	2.66
10.	1,2-Dichloroethene	-	<	2.66
11.	Chloroform	-	<	2.66
12.	1,2-Dichloroethane	-	<	2.66
13.	2-Butanone	-	<	10.64
14.	1,1,1,-Trichloroethane	-	<	2.66
15.	Carbon Tetrachloride	-	<	2.66
16.	Vinyl Acetate	-	<	5.32
17.	Bromodichloromethane	-	<	2.66
18.	1,2-Dichloropropane	-	<	2.66
19.	cis-1,3-Dichloropropene	-	<	2.66
20.	Trichloroethene	-	<	2.66
21.	Dibromochloromethane	-	<	2.66
22.	1,1,2-Trichloroethane	-	<	2.66
23.	Benzene	-	<	2.66
24.	trans-1,3-Dichloropropene	-	<	2.66
25.	Bromoform	-	<	2.66

CUSTOMER SAMPLE NO.: 900522-002 EHRT SAMPLE NO.: 24759

26.	4-Methyl-2-Pentanone	-	<	10.64
27.	2-Hexanone	-	<	2.66
28.	Tetrachloroethene	-	<	2.66
29.	1,1,2,2-Tetrachloroethane	-	<	2.66
30.	Toluene	-	<	2.66
31.	Chlorobenzene	-	<	2.66
32.	Ethylbenzene	-	<	2.66
33.	Styrene	-	<	2.66
34.	Xylene	-	<	2.66

SURROGATE STANDARDS - % RECOVERIES

1,2-Dichloroethane-d4	-	114%
Toluene-d8	-	100%
Bromofluorobenzene	-	103%

QUALITY CONTROL OFFICER: ______________________

DATE: ______________

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
VOLATILE ORGANIC ANALYSIS

CUSTOMER NAME:	U.S. ARMY CORPS OF ENGINEERS - DR. JOE SOLSKY		
SAMPLE SOURCE:	Phoenix-Goodyear Airport (Barrel No. 3)		
WORK ORDER NO.:	808	PROJECT NO.:	11564
DATE EXTRACTED:	N/A	DATE ANALYZED:	05-25-90
SAMPLE TYPE:	Soil Sample	SAMPLE WEIGHT:	1.00
ANALYST:	J. Tobler	PERCENT SOLIDS:	94.00
CUSTOMER SAMPLE NO.:	900522-003	EHRT SAMPLE NO.:	24760
LAB NOTEBOOK NO.:	123, Pg. 68	METHOD NO.:	EPA 8240

	COMPOUNDS			RESULT ug/kg
1.	Chloromethane	-	<	2.66
2.	Bromomethane	-	<	2.66
3.	Vinyl Chloride	-	<	2.66
4.	Chloroethane	-	<	2.66
5.	Methylene Chloride	-	<	5.32
6.	Acetone	-	<	5.32
7.	Carbon Disulfide	-	<	2.66
8.	1,1-Dichloroethene	-	<	2.66
9.	1,1-Dichloroethane	-	<	2.66
10.	1,2-Dichloroethene	-	<	2.66
11.	Chloroform	-	<	2.66
12.	1,2-Dichloroethane	-	<	2.66
13.	2-Butanone	-	<	10.64
14.	1,1,1,-Trichloroethane	-	<	2.66
15.	Carbon Tetrachloride	-	<	2.66
16.	Vinyl Acetate	-	<	5.32
17.	Bromodichloromethane	-	<	2.66
18.	1,2-Dichloropropane	-	<	2.66
19.	cis-1,3-Dichloropropene	-	<	2.66
20.	Trichloroethene	-	<	2.66
21.	Dibromochloromethane	-	<	2.66
22.	1,1,2-Trichloroethane	-	<	2.66
23.	Benzene	-	<	2.66
24.	trans-1,3-Dichloropropene	-	<	2.66
25.	Bromoform	-	<	2.66

CUSTOMER SAMPLE NO.: 900522-003 EHRT SAMPLE NO.: 24760

26.	4-Methyl-2-Pentanone	-	<	10.64
27.	2-Hexanone	-	<	2.66
28.	Tetrachloroethane	-	<	2.66
29.	1,1,2,2-Tetrachloroethane	-	<	2.66
30.	Toluene	-	<	2.66
31.	Chlorobenzene	-	<	2.66
32.	Ethylbenzene	-	<	2.66
33.	Styrene	-	<	2.66
34.	Xylene	-	<	2.66

SURROGATE STANDARDS - % RECOVERIES

1,2-Dichloroethane-d4	-	112%
Toluene-d8	-	112%
Bromofluorobenzene	-	89%

QUALITY CONTROL OFFICER: ______________________

DATE: ______________

PHOENIX GOODYEAR AIRPORT SUPERFUND SITE

FIELD INVESTIGATION REPORT

PHOENIX GOODYEAR AIRPORT/LORAL DEFENSE SYSTEMS

GOODYEAR, ARIZONA

SEPTEMBER 1990

VOLUME 2 OF 2

US Army Corps
of Engineers
Omaha District

FIELD INVESTIGATION REPORT

PHOENIX-GOODYEAR AIRPORT SUPERFUND SITE

GOODYEAR, ARIZONA

Prepared by

U.S. Army Corps of Engineers
Omaha District

September 1990

Volume 2 of 2

APPENDIX I

SOIL GAS INVESTIGATION -

SCOPE OF SERVICES AND FINAL REPORT

SCOPE OF SERVICES
SOIL GAS SAMPLING AND ANALYSES - PHOENIX-GOODYEAR AIRPORT SITE
GOODYEAR, ARIZONA

1. Description of Services: The contractor shall provide soil gas sample collection and analytical services. Twenty-two existing soil gas sampling ports installed by the U.S. Army Corps of Engineers (USACE), CH2M HILL, and Hydro Geo Chem, Inc. shall be sampled. Sampling and analysis shall be done generally in accordance with protocols used by Hydro Geo Chem during sampling for the Soil Vapor Pilot Study at the site.

2. Location and Description of the Soil Gas Sampling Ports: Ports to be sampled include eight ports installed in four separate clusters of two (USACE), and twelve ports installed in three clusters of four (Hydro Geo Chem) at the Loral Facility (1300 S. Litchfield Road, Goodyear, AZ). In addition, two individual ports (CH2M HILL) at the Phoenix-Goodyear Airport (PGA) (1658 S. Litchfield Road, Goodyear, AZ) shall also be sampled. The locations of the sampling ports are shown on figure 1. The eight ports in the four clusters were installed in February, 1990 by the U.S. Army Corps of Engineers. These ports are constructed of 1-inch diameter PVC with 5-foot long screens. The clusters (PG90- 3, 4, 5, and 8) consist of one deep probe with a screen set at a depth of approximately 45 feet generally in coarse-grained soils (silty sands, gravelly sands, clayey gravels, and cobbles), and the other probe set at a depth of approximately 20 feet in finer grained material (silty clays, clays, and silts). All ports are capped with PVC threaded end-caps, and in each flush-mount manhole is a valved "hose barb" end fitting that screws on to the casing top. The three clusters of four, VPA-1, 2, and 3, were installed by Hydro Geo Chem for the Soil Vapor Extraction Pilot Study. These ports consist of 1/2-inch diameter pipe and 1-foot long screens. The clusters consist of probes set at depths of approximately 7, 17, 27, and 37 feet. The two individual probes, 0910 and 0903, were installed by CH2M-Hill for EPA and consist of 2-inch diameter pipe with 50- to 55-foot screens. The bottoms of the screens are set at a depth of approximately 60-65 feet. Ground water is commonly found at a depth of approximately 55 feet. Depths, diameters, screened intervals, borehole diameters, and depths to bentonite/grout seals are shown in Table 1. Typical construction diagrams of PG90-3, 4, 5, and 8 are shown on figures 2, 3, 4, and 5; diagrams of VPA-1, 2, 3 and 0903 are found on figure 6. The construction of 0910 is identical to 0903 except for depth to the bottom of the screen.

Table 1

Well No.	Well Depth (ft)	Casing Diameter (in)	Screened Interval (Depth-ft)	Seal Depth (ft)
PG90-3 D	45	1	40-45	30-34
PG90-3 S	20	1	15-20	0-7
PG90-4 D	45	1	35-40	30-33
PG90-4 S	20	1	15-20	0-8
PG90-5 D	45	1	40-45	29-34
PG90-5 S	20	1	15-20	0-6
PG90-8 D	45	1	40-45	30-34
PG90-8 S	20	1	15-20	0-6
W0903	62	2	5-62	3-4
W0910	60	2	5-60	3-4
VPA-1a	7	0.5	6-7	3-4
VPA-1b	17	0.5	16-17	11-12
VPA-1c	27	0.5	26-27	23-24
VPA-1d	37	0.5	36-37	34-35
VPA-2a	7	0.5	6-7	3-4
VPA-2b	17	0.5	16-17	11-12
VPA-2c	27	0.5	26-27	23-24
VPA-2d	37	0.5	36-37	34-35
VPA-3a	7	0.5	6-7	3-4
VPA-3b	17	0.5	16-17	11-12
VPA-3c	27	0.5	26-27	23-24
VPA-3d	37	0.5	36-37	34-35

D - deep   S - shallow

3. Sampling Protocols: Sampling shall be done using special cartridges consisting of sorptive carbon housed in a glass tube inside of a stainless steel canister. All purging and sampling shall be done in a manner identical to methods used during the static sampling for the PGA Soil Vapor Extraction Pilot Study conducted by Hydro Geo Chem (as described in Appendix S of the PGA RI/FS), with a few exceptions. At a minimum, 5 casing+gravel pack volumes shall be purged prior to sampling. All samples shall be properly prepared and shipped to an off-site fixed laboratory, and analyzed within 48 hours from the time of collection. In particular, vacuum equipment configuration and sampling flow rates and volumes shall be identical to that used during the PGA Soil Vapor Extraction Pilot Study.

4. Analyses and Quality Control: The volatile organic compounds to be analyzed at each of the sampling ports are :

Trichloroethene (TCE)
Tetrachloroethene (PCE)
1,1 Dichloroethene
1,1,1 Trichloroethane
Carbon Tetrachloride
Chloroform

A. Sampling Equipment

Soil gas cartridges - Soil gas samples for the volatile analyses are to be trapped and concentrated in glass cartridges contained in stainless steel housing. The cartridges are packed to absorb the heavy, light, and ultralight hydrocarbons on three activated carbons; Carbotrap, Carbopack B, and Carbosieve 111. These cartridges have "breakthrough" volumes that should not be exceeded.

Sample collection - A minimum of five (5) casing+gravel pack volumes shall be purged from each sample port location before samples for analyses are taken. The mass flow volume of soil gas through the soil gas cartridges shall be monitored using a mass flow meter. This flow meter should be capable of measuring flows between 0 and 500 standard cubic centimeters per minute with less than 2% error independent of temperature and vacuum conditions. Two soil gas samples shall be taken at each probe placement. One of the sample cartridges shall be assayed with the second sample being used as backup or QC sample. A minimum of 10% of the field samples shall be QA samples (collected in stainless steel bombs) to be assayed by an outside laboratory.

Duplicate samples - Two soil gas samples are to be collected from each sampling probe. Duplicate analyses are to be performed on at least 10% of the samples collected, or if the initial analysis is outside the QA specifications. A new or cleaned sample cartridge is transported into the field with the sampling equipment for a trip blank. This trip blank cartridge is handled in the same manner as the sample, but a sample is not collected through this cartridge. The trip blank is returned to the lab with the other samples to be analyzed. If VOC's are detected above background in the trip blank, the field sample results are suspect. If no VOC's are detected above background levels in the trip blank, this cartridge can be used as a field blank.

Prior to each days sampling, atmospheric field blanks of the entire sampling apparatus shall be taken and analyzed to check for background contamination in the sampling system and cartridges. In addition, serial duplicates shall be taken from at least 10% of the samples as a measure of reproducibilty and at least 10% off-site laboratory samples are to be collected for QA sample analyses by an off-site laboratory.

Decontamination of Sampling Equipment - Prior to use and reuse, all sampling equipment shall be cleaned and stored in a clean storage area. Adapters and stainless steel bottles are to be heated to 120^{o} C for 1 hour. The carbon packed soil gas cartridges are to be purged at 400^{o} C with helium for 8 minutes. Also, cartridge holders are to be heated and purged at >200^{o} C for 20 minutes.

B. Analysis

Detection limits - The detection limits for soil gas shall be 0.01 ug/l.

Apparatus and Equipment - The Gas Chromatographs, GC Columns, Detectors, and Integrators should be equivalent to the Hydro Geo Chem analytical equipment used for the PGA Soil Vapor Extraction Pilot Study as stated in section 3 above.

Standardization and Calibration - Fresh standards are to be prepared from stock mixtures of neat reagent grade compounds. A systems blank and three calibration runs will be performed at the beginning of each day and additional calibrations after no more than every 10 samples. An atmospheric air sample shall be taken through the sampling apparatus to detect equipment contamination and to determine background concentrations of the selected compounds.

Soil Gas Reporting Requirements - Report all results of field samples, blanks, duplicates, detection limits, and tentative identification (if possible) of re-occuring analyte peaks for which no standards were required. A written description of any problems that occurred during sampling and analysis should be included. Please sumbit 3 copies of the final report to :

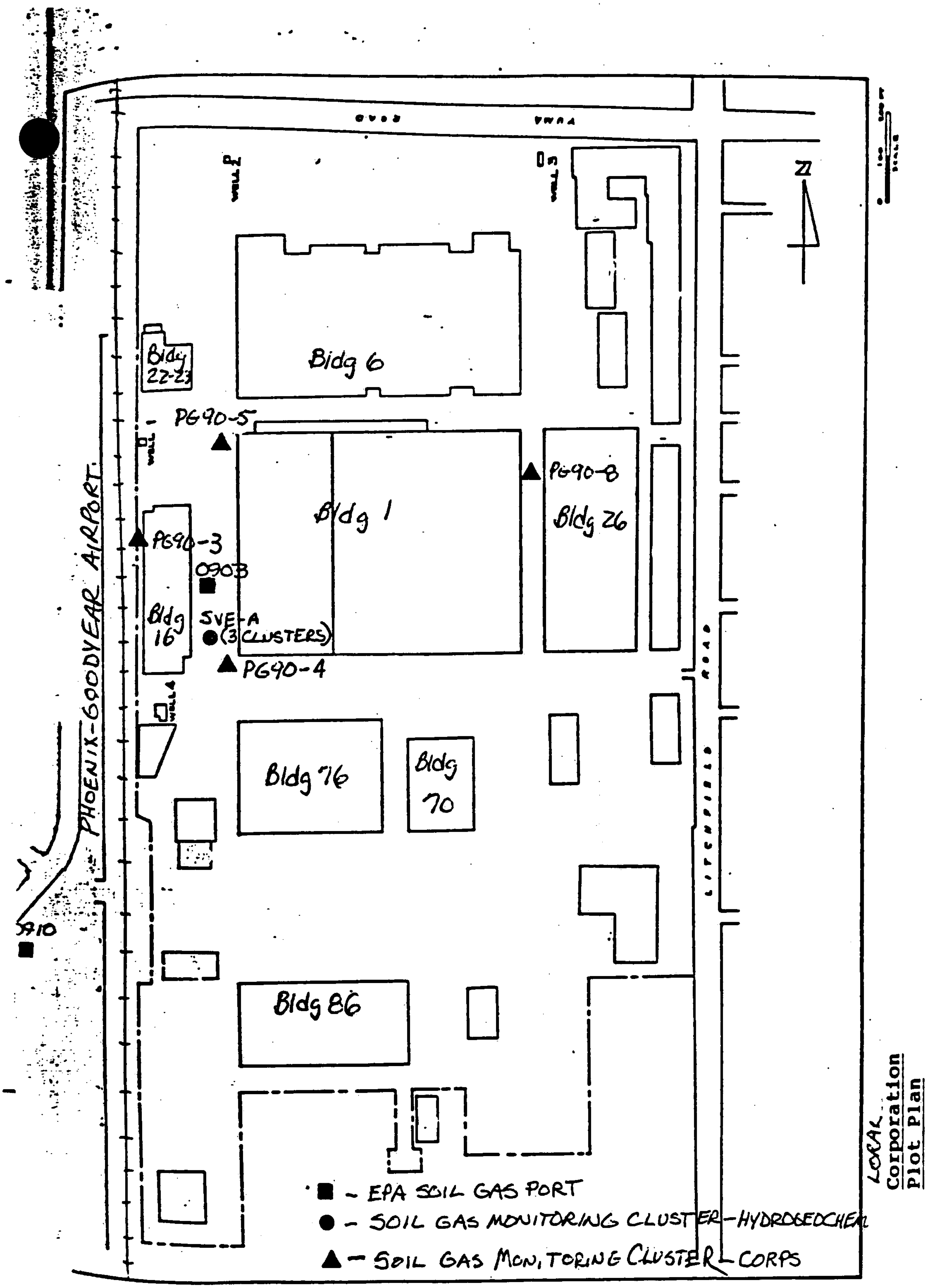
U.S. Army Corps of Engineers
215 N. 17th Street
Omaha, NE 68102-4978
ATTN: Mr. Stan Bauer
CEMRO-ED-EA

TABLE 2
SAMPLE REQUIREMENTS

PARAMETER	QUALITY CONTROL SAMPLES: NO. OF FIELD SAMPLES	NO. OF FIELD SPLIT/ DUP. (1)	NO. OF TRIP BLANKS (2)	TOTAL AE SAMPLES	QUALITY ASSURANCE SAMPLES: FIELD SPLITS (1)	TRIP BLANKS	TOTAL QA SAMPLES
SOIL GAS SAMPLES							
Sample Ports (USACE)							
PG90-3							
VOC's	4	0	0	4	0	0	0
PG90-4							
VOC's	4	1*	0	4	1*	0	1
PG90-5							
VOC's	4	0	0	4	0	0	0
PG90-8							
VOC's	4	0	0	4	0	0	0
Sample Ports (Hydro Geo Chem)							
VPA-1							
VOC's	8	0	0	8	0	0	0
VPA-2							
VOC's	8	0	0	8	0	0	0
VPA-3							
VOC's	8	0	0	8	0	0	0
Sample Port (CH2M Hill)							
0910							
VOC's	2	0	0	2	0	0	0
0903							
VOC's	2	0	0	2	0	0	0

*(1) One duplicate and one QA sample shall be run from PG90-4 S (shallow port). Another duplicate and QA sample shall be run from a sampling port that has shown contamination during previous sampling efforts. QA samples shall be collected in stainless steel bombs.

(2) One trip blank per round trip visit to the site for sampling.



LOCATION MAP

FIGURE

SOIL GAS SURVEY
LORAL FACILITY
GOODYEAR, ARIZONA

HYDRO GEO CHEM, INC.

Environmental Technology & Engineering

SOIL GAS SURVEY
LORAL FACILITY
GOODYEAR, ARIZONA

Submitted to

Army Corp of Engineers
Omaha, Nebraska

Submitted by

Hydro Geo Chem, Inc.
1430 North Sixth Avenue
Tucson, Arizona 85705

August 16, 1990

CONTENTS

INTRODUCTION

This report presents the methods and results of a soil gas investigation for volatile organic compounds performed April 16 and 17, 1990 at the Loral Facility in Goodyear, Arizona. The investigation was conducted by Hydro Geo Chem, Inc. under contract to U.S. Army Corp of Engineers. The soil gas investigation was designed to evaluate the near surface distribution of select chlorinated hydrocarbons on the site.

BACKGROUND & THEORY

Soil gas surveys consist of the sampling and analysis of the soil gases that reside in the pore space of the unsaturated zone above the water table. Because many common organic compounds and industrial solvents exhibit significant vapor pressures and are relatively insoluble in water, their introduction into subsurface soils results in vapor phase permeation and transport. Should these chemicals reach the water table and travel with the groundwater, vapors will continue to emanate from the contaminated groundwater into overlying soil. Thus organic contamination of the subsurface or groundwater can be detected by measuring the concentration of volatile organics in the soil gas.

The concentration of a volatile organic compound (VOC) in soil gas is a complex function of the distribution of the organic compound and its interaction with the soil. This interaction depends on a number of soil parameters including soil particle size and mineralogy, the soil's natural and anthropogenic organic content, soil moisture, temperature, lithology, and heterogeneity.

Whatever the source of the VOC in soil gas, its concentration is representative of soils contamination at the point of measurement. Volatile organic contaminants are present in the gas phase in unsaturated pore spaces, in the water contained in the unsaturated soils, and sorbed on the soil particles. The total soils concentration is the sum of the VOC's contained in the three phases. The partitioning of the VOC between gas, liquid and solid phases is dependent on both the soil properties and the chemical properties of the organic compound. Thus, given the chemical properties of the VOC and measurements or reasonable estimates of relevant soil parameters, soil-gas data can be used to provide semi-quantitative estimates of soil contamination.

Since equilibrium between phases is generally rapid compared to the rate of gaseous diffusion, soil gas concentrations can be used to estimate the total soil concentration. The major uncertainties in estimating soil concentration directly from soil gas concentrations are the organic and moisture content of the soils. Chemical properties of particular organic compounds are well known, (i.e., vapor pressure, solubility), and the other relevant soil parameters (i.e., bulk density, porosity) have relatively little effect on soil concentration estimates. The following equation relates soil gas concentrations to total soil concentrations.

$$\frac{C_g}{C_T} = \left[\frac{K_D \rho_b}{H_D} + \frac{\theta_w}{H_D} + (\theta_T - \theta_w)\right]^{-1}$$

Where C_g is the concentration in the gas [M/V air]

C_T is the concentration in the soil [M/V bulk volume soil]

K_D is the water-solid distribution coefficient [M/M solid/M/V water]

ρ_b is the bulk soil density [M/V solid]

H_D is the gas-water distribution coefficient [M/V air/M/V water]

θ_w is the water filled porosity

θ_T is the total porosity

The gas-water distribution coefficient (dimensionless Henry's law constant) is

$$H_D = C_g/C_w = H/RT \simeq \rho_g/S$$

where ρ_g is the saturated vapor density [M/V]

and S is the solubility [M/V].

H is the Henry's coefficient

R is the gas constant

T is the temperature in degrees Kelvin

The water-solid distribution coefficient is approximately

$$K_D = \frac{C_s}{C_w} \simeq \frac{K_{oc} \cdot \%OC}{100}$$

where C_s is the concentration in the solid (mg/gm)

C_w is the concentration in the water (mg/ml)

K_{oc} is the water-organic carbon distribution coefficient

%OC is the percent organic carbon in the soil

Use of soil gas to infer concentrations of sources at distance (such as groundwater plumes) is necessarily much more qualitative. Soil gas data used in this manner is limited by the lack of information regarding the soil parameters interposed between the source and sampling point. It is therefore generally not possible to make quantitative estimates of groundwater concentrations from soil gas samples collected at distance from the saturated interface. Away from source areas (ie. underground storage tanks, surface spills etc.) where only the groundwater is providing a significant soil gas concentration, soil gas is often an excellent relative indicator of groundwater contamination. The effectiveness of soil gas surveys to delineate groundwater contamination, is, however, dependent on the depth to groundwater, contaminant concentration in the groundwater, and distribution of air permeabilities in the unsaturated zone.

SCOPE OF WORK

Soil gas samples were collected at selected depths from 9 locations on the investigation site. All sampling was done at existing monitoring wells. Due to discrepencies in analytical results, vapor monitoring well PG 905 was resampled in July of 1990.

The volatile organic compounds that were analyzed at each of the sampling locations included the chlorinated hydrocarbons:

Tetrachloroethene (PCE)
Trichloroethene (TCE)
1,1 - Dichloroethene (1,1 - DCE)
1,1,1 - Trichloroethane (1,1,1 - TCA)

Carbon tetrachloride

Chloroform

These organic compounds were chosen for analysis because they are commonly used solvents and their degradation products.

METHODS AND INSTRUMENTATION

The samples were collected by withdrawing the soil gas from selected depths within each monitoring well using a Hydro Geo Chem designed, computerized mass-flow controller to regulate flow and measure volume sampled. The volatile organics were trapped and concentrated in a glass cartridge contained in a stainless steel housing. The concentrating cartridge was packed with three activated carbons, Carbotrap, Carbopak-B, and Carbosieve S-III, selected to quantitatively trap organics with widely different volatilities. After sampling, the cartridges were brought to the on-site mobile laboratory for analysis.

Gas chromatographic techniques were used to identify and measure concentrations of the various compounds. The soil gas cartridges were desorbed at a temperature of 380 °C using a thermal desorption unit. Samples were injected by the desorber into a gas chromatograph equipped with a capillary column and a photoionization (PID) and Hall conductivity detector.

The make and model of the equipment used to perform these on-site analyses included:

Envirochem 850 Thermal Tube Desorber

Varian 3400 Gas Chromatograph

Tracor 700A Hall Detector

Tracor 703 PID Detector

DB 624 30m Megabore column, J.W. Scientific

Spectra Physics 4400 Chrom Jet Integrator

Varian 3400 Integrator

QUALITY ASSURANCE/QUALITY CONTROL

Quality control and quality assurance were achieved through strict experimental protocol. Chain of custody procedures were observed. All parts of the collection system that come in contact with a sample were cleaned before each use. A systems blank and three calibration runs were performed at the beginning of each day and additional calibrations after every 10 samples.

Standards were prepared from stock mixtures of neat reagent grade compounds prepared by weighing each compound addition to the mixture and weighing an aliquot volume of the final mixture to establish density (weight/volume). For preparation of daily standards, a measured volume of the standard mixture was injected into a nitrogen-filled 1-liter glass gas bottle through a septum side port. A measured volume of the resulting gas mixture was then injected into a 200-ml/min helium stream feeding a glass, carbon-packed concentrating cartridge. After two minutes the cartridge was transferred to the thermal desorber and analyzed exactly as the soil-gas samples.

Prior to each day's sampling, atmospheric field blanks of the entire sampling apparatus were taken and analyzed to check background contamination in the sampling system and cartridges. In addition, serial duplicates were taken from 10% of the sample locations as a measure of reproducibility.

Detection limits were 0.01 micrograms or less per liter of soil gas for all compounds analyzed. Analyses are reported to two significant figures; the minimum amount reported is 0.01 micrograms/liter. In some of the analyses, high levels of a compound may have interfered with and prevented detection of a compound present at a very low level and possessing a similar chromatographic retention time. Also, some of the lower levels of aromatic compounds may have been due to a memory effect from a previous high-concentration injection. Attempts were made to minimize this possibility by baking out the system after high concentrations had been analyzed.

RESULTS

Table 1 presents the measured soil gas concentrations from each sampling location. Concentrations, reported in micrograms per liter ($\mu g/l$) of soil gas, ranged from less than the detection limit of 0.01 $\mu g/l$ to in excess of 3,000 $\mu g/l$(gas). Table 2 presents the analytical results for the outside laboratory verification analyses. Conversion of soil gas concentrations from $\mu g/l$ (gas) to ppmV can be achieved by the following equation.

$$C_{ppmV} = C_{\mu g/l} \times RT/M_wP$$

where C_{ppmv} = soil gas concentration in ppmV

$C_{\mu g/l}$ = soil gas concentration in $\mu g/l$ (gas)

R = 0.08205 L-Atm/deg-mole

T = $^{\circ}K$

M_w = molecular wgt in grams

P = pressure in atmospheres

For most compounds C_{ppmV} is approximately 0.25 $C_{\mu g/l}$.

On site analyses during this investigation were performed using a standard that mistakenly did not contain 1,1,1 TCA. Back calibrations for 1,1,1 TCA were performed using the same mobile lab after it returned to Hydro Geo Chem's Tucson office. Due to the back calibration process, questions were raised as to the validity of carbon tetrachloride results reported from sample PG 905-20. Resampling of PG 905-20 and PG 905-45 revealed that 1,1,1 TCA and not carbon tetrachloride was present in the vapor samples collected from these vapor monitoring installations.

TABLE 1
SUMMARY OF ANALYTICAL RESULTS
APRIL 17, 1990
LORAL FACILITY
GOODYEAR, ARIZONA
(UNITS OF CONCENTRATION, uG/L gas)

SAMPLE	DEPTH	1,1-DCE	CHLORO FORM	1,1,1-TCA	CARBON TET	TCE	PCE
SG-TRIP*	0	ND	ND	ND	ND	ND	ND
FB17APR	0	ND	ND	ND	ND	ND	ND
0910 -A	60.00	ND	15.00	ND	ND	516.00	10.90
0910 -B	60.00	ND	16.00	ND	ND	518.00	6.50
PG903	45.00	29.20	ND	25.10	ND	125.00	0.98
PG903	20.00	14.40	ND	208.00	ND	55.00	0.67
PG904-A	20.00	67.60	0.70	ND	38.20	3350.00	268.00
PG904-B	20.00	99.00	1.00	ND	64.00	3460.00	307.00
PG904	40.00	87.60	2.76	ND	2.14	653.00	103.00
PG905	45.00	2400.00	ND	2070.00	ND	453.00	14.10
PG905-A*	45.00	1590.00	ND	2510.00	ND	31.1	ND
PG905-B*	45.00	2280.00	ND	2050.00	ND	35.4	ND
PG905	20.00	1910.00	ND	ND	1720.00**	63.00	1.00
PG905-A*	20.00	3280.00	ND	1880.00	ND	666.00	6.29
PG905-B*	20.00	3910.00	ND	1900.00	ND	740.00	6.58
PG908	20.00	464.00	10.20	ND	ND	445.00	3.33
PG908	45.00	552.00	17.90	ND	ND	389.00	1.55
SVEA1	7.00	5.59	0.87	ND	ND	168.00	4.85
SVEA1	17.00	0.24	ND	ND	ND	5.93	ND
SVEA1	27.00	0.19	ND	ND	ND	4.53	ND
SVEA1-A	37.00	33.90	3.71	0.86	ND	1230.00	27.30
SVEA1-B	37.00	58.40	4.37	ND	ND	1080.00	22.80
SVEA2	7.00	5.55	0.95	32.90	ND	103.00	1.18
SVEA2	17.00	14.10	ND	63.70	ND	7.42	ND
SVEA2	27.00	0.37	2.44	ND	ND	4.15	ND
SVEA2	37.00	48.80	4.11	ND	0.56	755.00	27.40
SVEA3	7.00	4.97	ND	ND	ND	216.00	13.30
SVEA3	17.00	11.80	3.47	ND	ND	72.30	0.55
SVEA3	27.00	ND	ND	ND	ND	17.60	0.23
SVEA3	37.00	73.50	1.82	6.63	0.69	306.00	26.10
W0903	62.00	98.80	6.83	ND	ND	442.00	10.00

* = RESAMPLED JULY 9, 1990
** = MISIDENTIFIED AS INDICATED BY RESAMPLING
A,B = SERIAL DUPLICATES
ND = NOT DETECTED ABOVE DETECTION LIMIT OF 0.01 uG/L (GAS)

TABLE 2
SUMMARY OF OUTSIDE LAB VERIFICATION
ANALYTICAL RESULTS
EPA 601 - PURGEABLE HALOCARBONS
LORAL FACILITY, GOODYEAR, ARIZONA
(UNITS OF CONCENTRATION, uG/L GAS)

COMPOUND	PG904-20	SVEA1-37
CHLOROMETHANE	ND	ND
BROMOMETHANE	ND	ND
VINYL CHLORIDE	ND	ND
CHLOROETHANE	ND	ND
DICHLOROMETHANE	ND	ND
TRICHLOROFLUOROMETHANE	ND	ND
1,1-DICHLOROETHENE	89.20	29.80
1,1-DICHLOROETHANE	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	ND
CHLOROFORM	58.70	12.20
1,2-DICHLOROETHANE	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND
CARBON TETRACHLORIDE	52.40	9.89
BROMODICHLOROMETHANE	ND	ND
1,2-DICHLOROPROPANE	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND
TRICHLOROETHENE	3080.00	1020.00
DIBROMOCHLOROMETHANE	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND
2-CHLOROETHYLVINYL ETHER	ND	ND
BROMOFORM	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND
TETRACHLOROETHENE	322.00	82.20
CHLOROBENZENE	ND	ND

APPENDIX A:

CHROMATOGRAMS AND FIELD DATA SHEETS

Phoenix Goodyear Airport

1. Standards Preparation

Standards were prepared by weighing equivalent volumes of the following compounds to make an approximately equal mass mixture:

Compound	Density g/ml	Mass, g	vol	% w/w	Effective Conc in liter Cylinder	
TCE	1.460	2.56	1.75	18.5	1123	1.123
PCE	1.623	2.95	1.82	21.3	1798	1.798
1,1-DCE	1.170	1.81	1.55	13.1	799	0.799
~~1,1,1-TCA~~ [1]	~~1.338~~	~~1.42~~	~~1.06~~	~~10.3~~	~~622~~	~~0.622~~
CCl4 [2]	1.594	4.27 ~~2.85~~	~~1.79~~ 2.68	~~20.6~~ 30.8	~~1248~~ 1906	~~1.248~~ 1.91
Chloroform	1.483	2.26	1.52	16.3	990	0.990
	Σ	~~13.85~~	~~9.79~~ mL			
		13.85	9.32 mL			

$\rho_\Sigma = 1.44\ g/ml \longrightarrow 1440\ \mu g/\mu l$

$$\frac{1440\ \mu g}{\mu L}(x) = \frac{6.0\ \mu g}{mL}(1000\ ml)$$

$$x = 4.16\ \mu L$$

For TCE $\quad \frac{2.56\ g}{9.49\ mL} = 0.27\ g/ml$

$$\frac{0.27\ g}{ml}(4.16\ \mu l)\ \frac{1}{L}\ \frac{ml}{1000\ \mu L}\ \frac{1000\,000\ \mu g}{g} = 1123\ \mu g/L$$

2. Arrived on-site at 0800. During set-up, realized new N_2 tank was empty. Substituted He for purge gas. Could not resolve CCl_4 and 111TCA. I will do analyses of neat standards of Chloroform, CCl_4, and 111TCA to be certain of on-site chromatography.

[1] 1,1,1-TCA Not included in mix

[2]

Phoenix Goodyear Airport

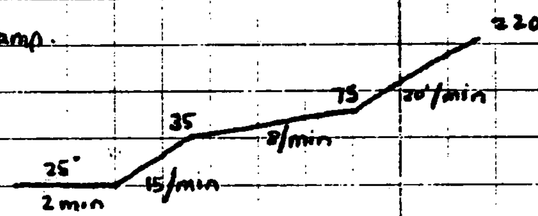
Chromatographic Conditions

Gas Flows
- He : 8 ml/min → 4.5 ml/min
- H_2 : 30 ml/min
- N_2 : 150 "

Tank Pressures
- 290 psi
- 1000
- > 2000 (Changed to He)

Temperature / Heated Zones
- Injectors: 230°c
- Detectors: 230°c
- Desorb Oven: 230°c
- Xfer line: 235°c
- Desorb Temp: 420°c
- Desorb Time: 11 min
- Aux. Temp: 230°c

Ramp.



Integration / Acquisition Parameters

Attenuation		Range
ELCD	variable	100 – 1000
PID	64	11
Solvent flow		.5 ml/min
PID Intensity		4

Columns

DB624 30m Mega Bore Thick film

Operator

Scott J. Wightman

Chromatography progressed slowly. Acquiring gases, trying to separate co-elutes, hunting down leak and plug were reasons for slow progress. Many samples required resampling. Most showed very high levels of TCE.

17 APR 90 - On site at 0930. Began calibrating. System performing acceptably. Have approx 10 more samples (four are resamples, with one resample site in duplicate PG90-4-S).

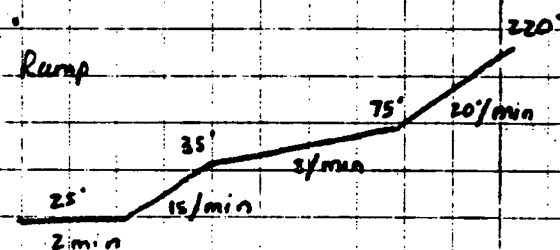
Chromatographic Conditions.

Gas Flows
H_e 8 ml/min
H_2 30
N_2 120 (using He)

Tank Pressures
2850 psi
900
2200

Temperature / Heated Zones
Injector 230°C
Detectors 230
Desorb Oven 214
xfer line 215
Desorb temp 108
Desorb time 11
Aux. temp 230

Ramp



Integration / Acquisition Parameters
Attenuation Range
ELCD variable 100 - 1000
PID 64 10
Solvent Flow .5 ml/min
PID Intensity 4

Columns
DB624 30 m Mega Bore Thick-film

Operator
Scott J. Wightman

Lab down at 1630. Left for Tucson at 1900. An addendum to this report will follow regarding separation of co-eluters. Results may be used to back-calculate individual analytes as well as to verify previous assignments. Upon returning to the Tucson office, calibration for 1,1,1-TCA was carried out. It was determined that 1,1,1-TCA was not included in the original calibration standard prepared 15 Apr 90; rather, 1.12 g of Carbon tet was added to this solution which already contained 2.55 g Carbon tet. Therefore, the total mass of Carbon tet in original solution was/is 4.27 g.

The chromatograms acquired on-site will be evaluated for 1,1,1-TCA. Also, re calculations will be done on these chromatograms regarding analyses for carbon tetrachloride.

Phoenix Goodyear Airport (cont)

Addendum

1. Reevaluation of Field Data for 1,1,1-TCA and Carbon tetrachloride.

Following the derivitization of Calib data for 1,1,1-TCA and TCE, all field data were re-evaluated for 1,1,1-TCA and Carbon tet. Carbon tet values required adjustment due to a slight change in Response factors attributed to a greater mass of Carbon tet being in the primary standard. Original data were derived using a mass of 2.84 g ; 4.27 g were actually used. All data were corrected for 1,1,1-TCA concs by noting the change in sensitivity relative to TCE among days field data were collected (April 16, 17 1990) and the day calib data for 1,1,1-TCA were derived (April 15, 1990).

	MASS, ug	AREA$_1$	AREA$_2$	AREA$_3$	AREA$_{\bar{x}}$	RF
DCE 11	0.80	3 649 291	4 187 852	3 283 614	3 706 919	4 633 648
Chlorof	0.99	7 773 803	8 848 865	8 072 638	8 231 769	8 314 918
~~TCA111~~ CCl4	~~1.87~~ 1.91	11 344 820	10 923 827	9 324 278	10 530 975	5 513 599
TCE	1.12	2 819 254	2 839 500	2 477 880	2 712 211	2 421 617
PCE	1.30	2 504 679	2 570 304	2 321 338	2 465 440	1 896 493

*1,1,1-TCA NOT INCUDED IN PRIMARY STANDARD MIX

					$\bar{x}$
DCE 11	4.70	4.79	5.0	4.80	4.82 ± 2(.13)
CHLOROF	7.32	7.35	7.58	7.40	7.42 ± 2(.12) 7.57 = estimate of RT for 1,1,1-TCA
~~TCA111~~ CCl4	7.75	7.78	8.01	7.85	7.85 ± 2(.12)
TCE	8.72	8.73	8.92	8.80	
PCE	10.44	10.43	10.60	10.50	

	Mass, ug	AREA₁	AREA₂	AREA₃	AREA_x	RF
DCE11	0.80	7 729 028	7 190 974	6 532 432	7 150 811	8 938 514
CHLF	0.99	10 471 382	7 640 188	9 056 159	7 722 576	9 820 784
CCl_4 ~~111X~~	~~1.87~~ 1.91	16 277 972	14 907 346	14 961 607	15 592 659	~~8 338 320~~ 8 163 696
TCE	1.12	11 962 825	10 502 741	11 056 981	11 174 182	9 976 949
PCE	1.30	9 584 565	8 956 766	9 293 644	9 278 392	7 137 224

DCE11	3.79	3.86	3.87	3.84 ± 2 (.04)
CHLF	6.16	6.18	6.19	6.18 ± 2 (.02)
~~111X~~ CCl_4	6.54	6.56	6.56	
TCE	7.58	7.59	7.60	
PCE	9.52	9.53	9.55	

On avg. 111-TCA will show up at 6.33

	Mass, ug	AREA 1	AREA 2	AREA 3	AREA $\bar{x}$	RF
DCE 11	0.80	6 270 072	5 606 370	6 281 756	6 055 451	7 569 324
CHLF	0.99	9 843 972	9 679 058	9 875 864	9 799 631	9 898 618
~~TCA111~~ CCl4	~~1.87~~ 1.91	14 636 786	14 433 330	14 825 161	14 631 759	~~7 824 470~~ 7 660 607
TCE	1.12	6 724 977	7 040 614	6 537 520	6 768 037	6 042 890
PCE	1.30	6 259 058	6 285 300	6 109 357	6 492 971	4 994 593

				$\bar{x}$
DCE 11	3.69	3.70	3.73	3.71 ± 2(.02)
CHLF	6.05	6.06	6.09	6.06 ± 2(.02)
~~DHX~~ CCl4	6.44	6.44	6.47	
TCE	7.48	7.49	7.51	
PCE	9.48	9.48	9.49	

6.22 = estimate of RT for 1,1,1-TCA

METHOD 2
TIME 14:01 16 APR 90
REV 9004161346

INITIAL COLUMN TEMP 25°
INITIAL COL HOLD TIME 2.00

	FINAL		HOLD	TOTAL
PRGM	TEMP	RATE	TIME	TIME
1	35	15.0	0.00	2.66
2	75	8.0	0.00	7.66
3	220	20.0	0.00	14.91

INJECTOR TEMP 230°
INJ HOLD TIME 0.00

AUXILIARY TEMP 230°
INITIAL AUX HOLD TIME 0.00

DETECTOR TEMP 230°

FID A ATTEN RANGE A/Z
8 11 YES

FID B ATTEN RANGE A/Z
64 11 YES

PLOT SPEED 0.5 CM/MIN
ZERO OFFSET 15 %
PLOT SIGNAL A
[illegible]

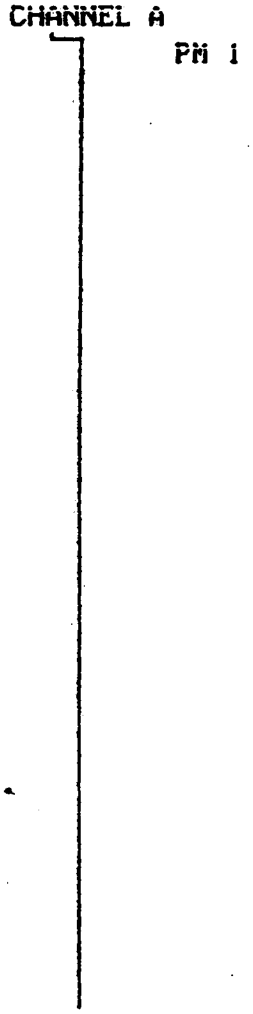
[illegible]
LONG REPORT [illegible]
RESULT CALCU[illegible]
[illegible]VISOR 1.0000[illegible]
[illegible]NT STANDARD 1.0000[illegible]
MULTIPLIER 1.00000000
RESULT UNITS A
REPORT [illegible]IDENTIFIED PEAKS YES
[illegible] FACTOR 0.00000000

[illegible]
[illegible]NAL TO [illegible]
[illegible]ENT PEA[illegible]
[illegible] PEAK W[illegible]

```
RT(1)=4.15
RT(2)=6.20
RT(3)=6.55
RT(4)=7.55
RT(5)=9.50


MN=  5.      REM  FE=  1.      CH= "A"  PS=  1.

NM    = "GOODY"    NM(1)= "EAR   "

PW    = 6.         PT    = 1000.      RN    = 45.
IX    = 1.         OD    = 1.         PH    = 0.
TB    = 0.         CZ    = 5.         LC    = 0.
LS    = 0.         SI    = 0.         CI    = 1000.
RA    = 1.         SP    = 45.

TT(1)=    0.1      TF(1)="PM"      TV(1)=    1.



TT(2)=    0.1      TF(2)="AZ"      TV(2)=    1.
TT(3)=   25.       TF(3)="ER"      TV(3)=    1.

RT(1)=    4.15     CN(1)= "DCE   "
RF(1)=**********

RT(2)=    6.2      CN(2)= "CHLF  "
RF(2)=**********

RT(3)=    6.55     CN(3)= "MIX   "
RF(3)=**********

RT(4)=    7.55     CN(4)= "TCE   "
RF(4)=**********

RT(5)=    9.5      CN(5)= "PCE   "
RF(5)=**********

AN    = "SCOTT"    AN(1)= "      "    AN(2)= "      "

CU    = "      "   CU(1)= "UG/L  "
```

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SYSTEM BLANK
END OF DIALOG

CHANNEL A INJECT 04/16/90 10:07:03 STORED TO BIN # 3



DATA SAVED TO BIN # 3

GOODYEAR 04/16/90 10:07:03 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 3 INDEX 1 BIN 3

ANALYST: SCOTT

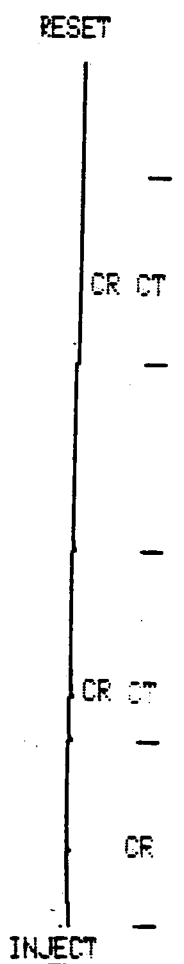
NAME	UG/L	RT	AREA BC	RF
TOTALS	0.			

CS=.5

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 3
TIME 10:02 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

DETECTED PEAKS: 0 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 175.8 OFFSET: -25

ERROR LOG:
NO PEAKS



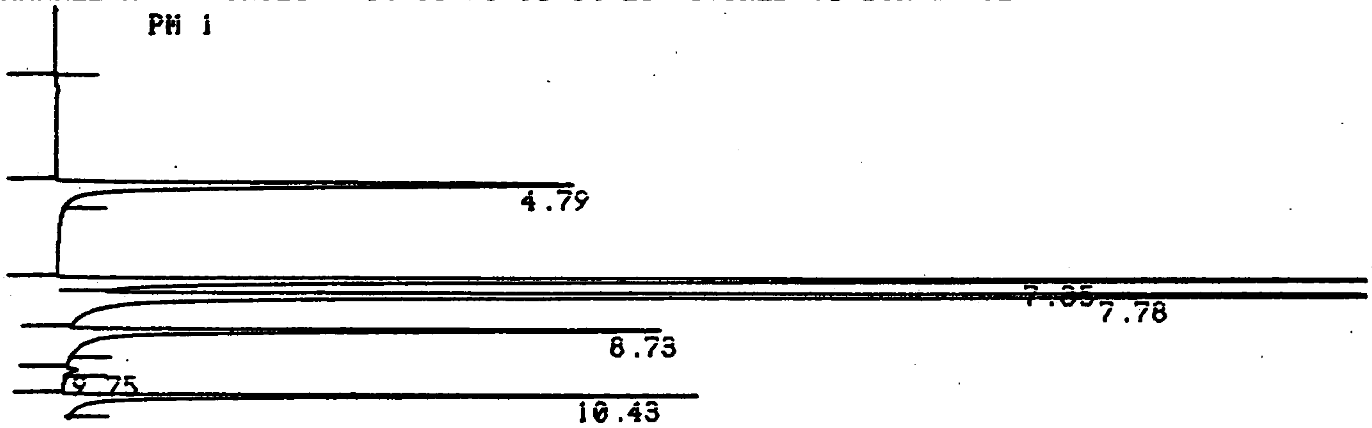
FID A 64X11 0.5 CM/M 15%

Calib 1

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION 1
END OF DIALOG

SA=1
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/16/90 13:54:20 STORED TO BIN # 12



DATA SAVED TO BIN # 12

GOODYEAR 04/16/90 13:54:20 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 12 INDEX 1 BIN 12

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	4.79	3649291	01	11DCE
2	0.	7.35	7773803	02	Chlorof
3	0.	7.78	11344820	08	CCl_4 - TCA111
4	0.	8.73	2819254	05	TCE
5	0.	9.75	50663	01	
6	0.	10.43	2504679	01	PCE
TOTALS	0.		28142510		

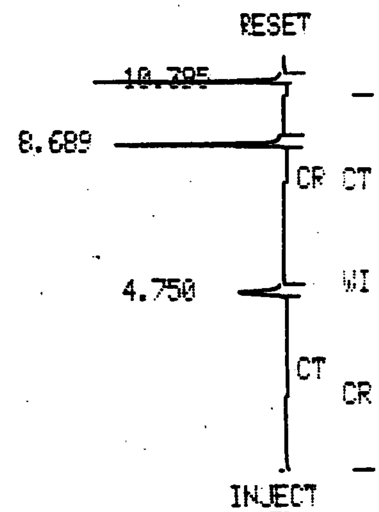
Calib 1

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 12
TIME 13:49 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		4.750	19.5159	35742
2		8.689	42.4656	77774
3		10.395	38.0183	69629
TOTALS:			100.0000	183147

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 175.8 OFFSET: -23

ERROR LOG:
ANNOTATION OMITTED

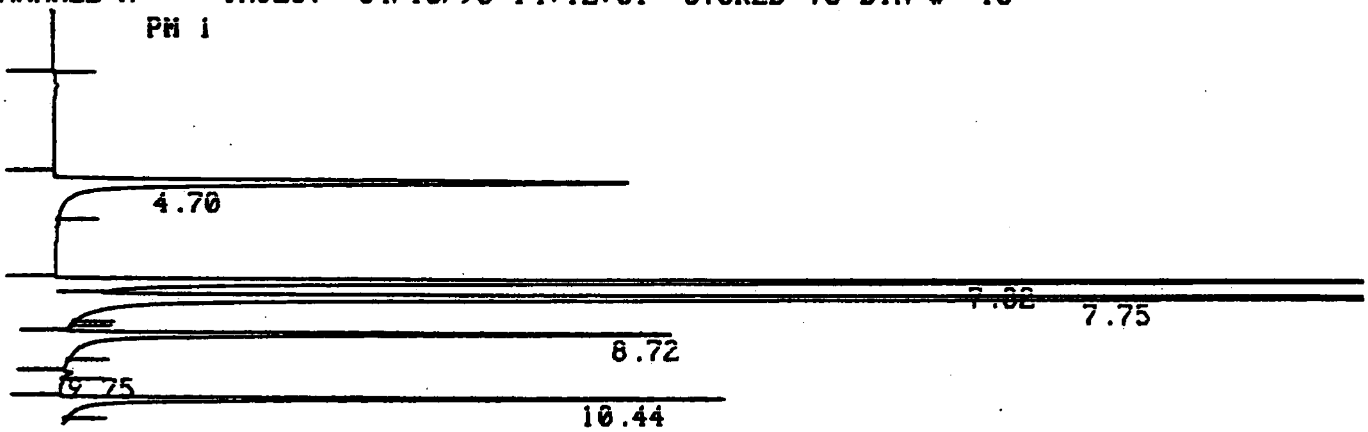


FID A 8X11 0.5 CM/M 15%

Calib 2

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX   NAME   SAM AMT   SCALE
SI= CALIBRATION 2
END OF DIALOG
SA=1
AT   [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) =

CHANNEL A   INJECT 04/16/90 14:12:01   STORED TO BIN # 13



DATA SAVED TO BIN # 13

GOODYEAR   04/16/90 14:12:01   CH= "A"   PS= 1.

FILE 1.   METHOD 5.   RUN 13   INDEX 1   BIN 13

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	4.7	4187852	01	
2	0.	7.32	8848665	08	
3	0.	7.75	10923827	05	
4	0.	8.72	2839500	01	
5	0.	9.75	38099	01	
6	0.	10.44	2570304	01	
TOTALS	0.		29408447		

Calib 2

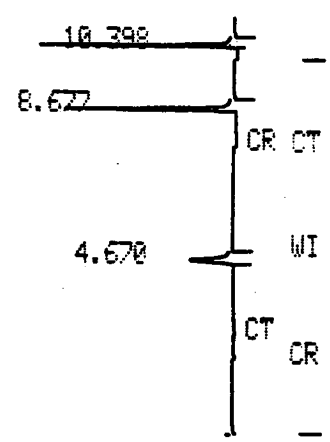
VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 13
TIME 14:07 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		4.670	18.6378	34895
2		8.677	42.6397	79834
3		10.398	38.7223	72499
TOTALS:			100.0000	187229

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 175.8 OFFSET: 6

ERROR LOG:
ANNOTATION OMITTED

RESET



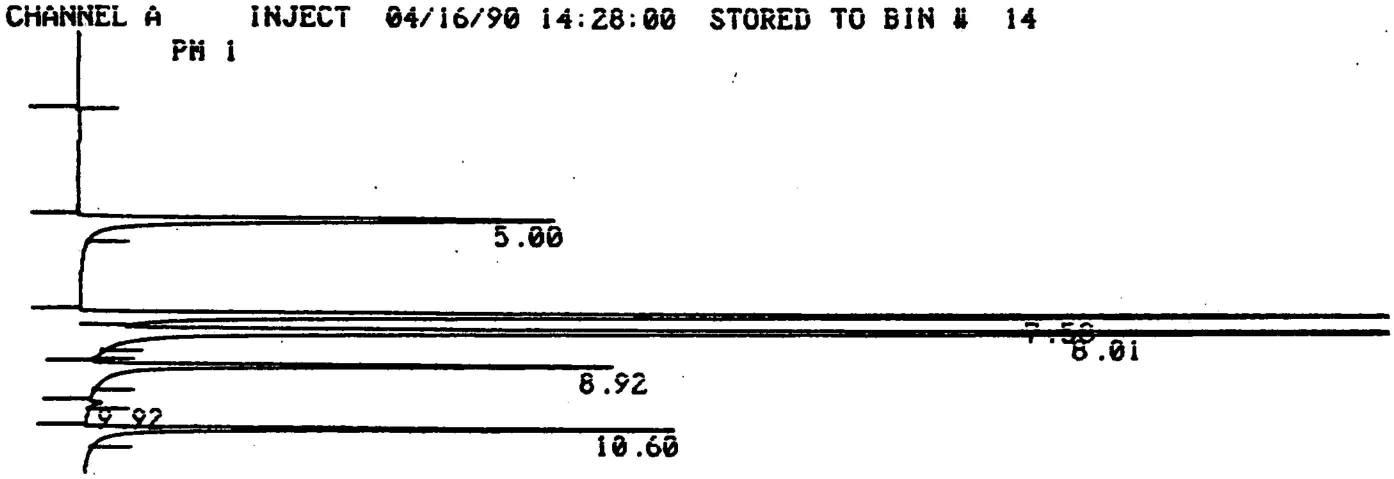
INJECT
FID A 8X11 0.5 CM/M 15%

14:04 FAULT 59 DET B FLAMEOUT
14:04 FAULT 47 DET A FLAMEOUT
14:04 FAULT 59 DET B FLAMEOUT
14:04 FAULT 47 DET A FLAMEOUT

Calib 3

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME          SAM AMT      SCALE
SI= CALIBRATION 3
END OF DIALOG
SA=1
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 512.) =
```

CHANNEL A   INJECT 04/16/90 14:28:00 STORED TO BIN # 14



DATA SAVED TO BIN # 14

GOODYEAR   04/16/90 14:28:00   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 14   INDEX 1   BIN 14

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	5.	3283614	01	
2	0.	7.58	8072638	08	
3	0.	8.01	9324278	05	
4	0.	8.92	2477880	01	
5	0.	9.92	53922	01	
6	0.	10.6	2321338	01	
TOTALS	0.		25533670		

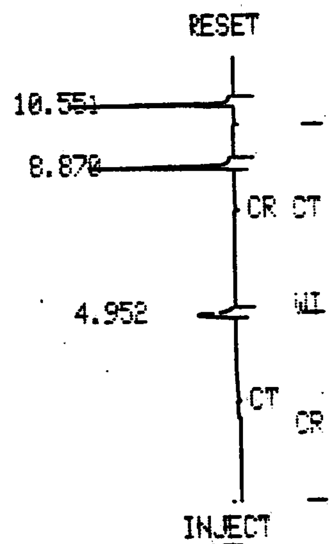
Calib 3

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 14
TIME 14:23 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		4.952	19.4372	30075
2		8.870	41.9529	64915
3		10.551	38.6097	59742
TOTALS:			100.0000	154733

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 175.8 OFFSET: -14

ERROR LOG:
ANNOTATION OMITTED



FID A 8X11 0.5 CM/M 15%

14:22 FAULT 59 DET B FLAMEOUT
14:22 FAULT 47 DET A FLAMEOUT

Field Blank

SAMPLE TABLE...

ANALYST (SCOTT) AN="

INJECTIONS/SAMPLE [0-254] (1.) RA=

SAMPLES BETWEEN CALIB [0-254] (****) CI=

CONC UNITS (UG/L) CU="

SAM IX NAME SAM AMT SCALE

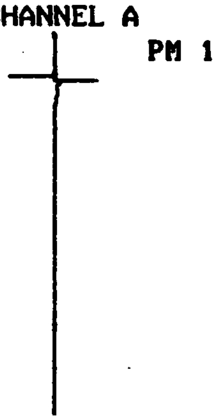
SI= FIELD BLANK FB17APR90

END OF DIALOG

SA=1

XF=10

CHANNEL A INJECT 04/17/90 16:56:11 STORED TO BIN # 68



DATA SAVED TO BIN # 68

GOODYEAR 04/17/90 16:56:11 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 69 INDEX 1 BIN 68

ANALYST: SCOTT

SAMPLE 1 BIN 68 NAME ARUN0067

NAME	UG/L	RT	AREA BC	RF
TOTALS	0.			

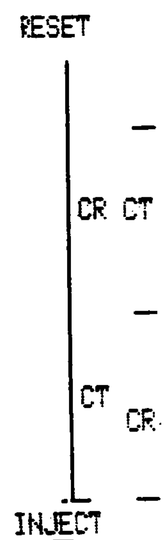
WARNING - MEMORY AT 2. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

Field Blank

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 67
TIME 17:01 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

DETECTED PEAKS: 0 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: 0

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
NO PEAKS



FID A 8X10 0.5 CM/M 15%

MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -12

ERROR LOG:
FACTORS ZERO
NO PEAKS

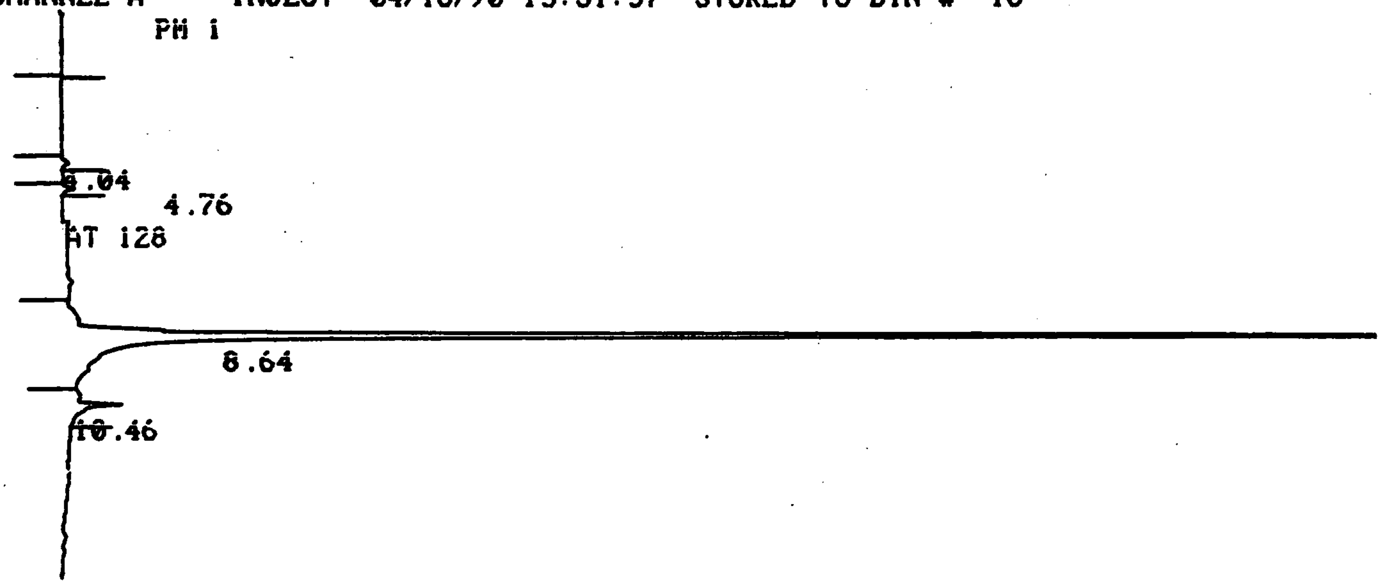
RESET

INJECT
FID A 8X10 0.5 CM/M 15%

16:51 FAULT 59 DET B FLAMEOUT
16:51 FAULT 47 DET A FLAMEOUT

SVEA38

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME            SAM AMT     SCALE
SI= SVEA38  MP  1100  50 ML  X10
END OF DIALOG
SA=.05
XF=10
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 1024) =

CHANNEL A     INJECT  04/16/90 15:31:57  STORED TO BIN #  16
```




```
DATA SAVED TO BIN #  16


GOODYEAR                     04/16/90 15:31:57     CH= "A"  PS=  1.

FILE  1.    METHOD  5.     RUN  18     INDEX   1              BIN  16

ANALYST: SCOTT
```

NAME	UG/L	RT	AREA BC	RF
1	0.	4.04	72311 01	
DCE	4.974	4.76	115239 014633648.	
TCE	216.301	8.64	2618990 022421617.	
PCE	13.227	10.46	125425 031896493.	
TOTALS	234.502		2931965	

WARNING - MEMORY AT 0. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

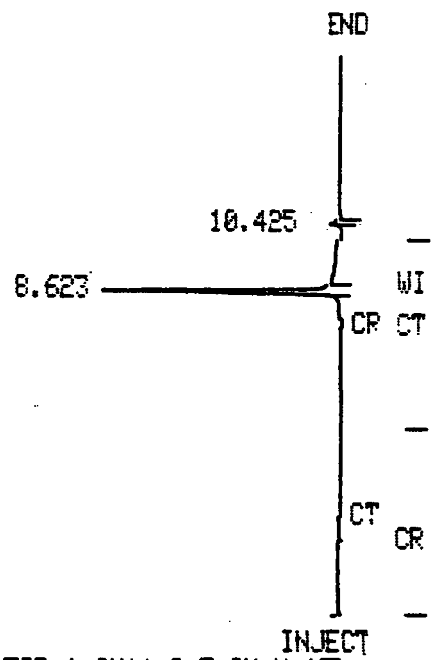
SVEA 38

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 16
TIME 15:27 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		8.623	98.4349	125713
2		10.425	1.5650	1998
TOTALS:			100.0000	127712

DETECTED PEAKS: 2 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 344.9 OFFSET: -32

ERROR LOG:
ANNOTATION OMITTED



FID A 8X11 0.5 CM/M 15%

NOISE = 344.9

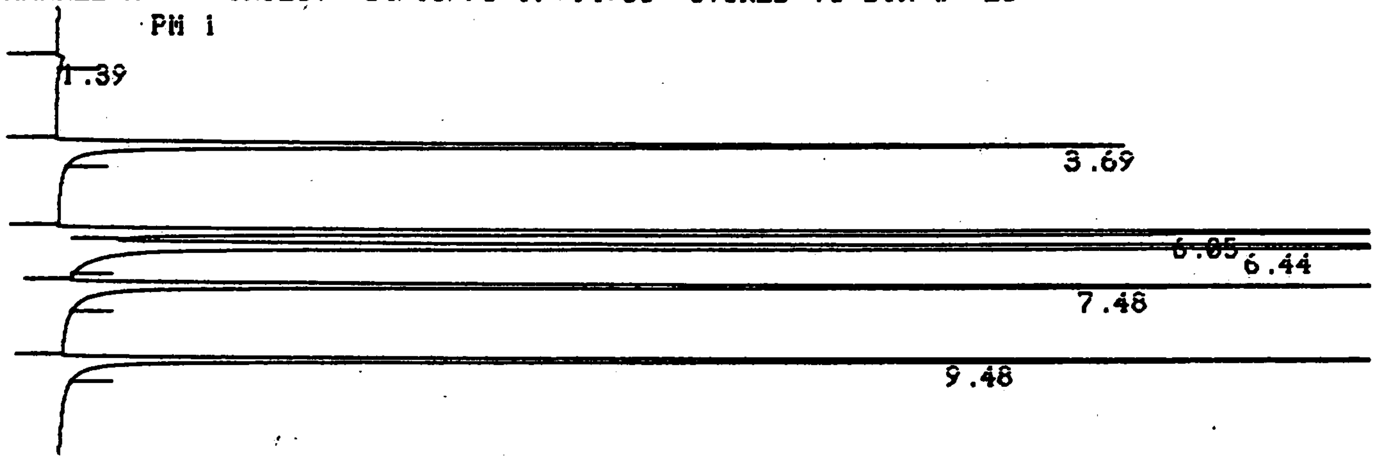
Recalibration was done because of the need to increase carrier flows from 4.00 to 8 ml/min. This was done to hasten run time, while minimizing risk of having something lodge in the sample line. (i.e. The valve oven became plugged with debris coming from ferrule on oven side of desorber-tube heated zone.)

S. Wightman
1921 04/16/90

Recal. 1 434

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= RECALIBRATION 1
END OF DIALOG
SA=1
XF=1
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/16/90 19:14:50 STORED TO BIN # 26



DATA SAVED TO BIN # 26

GOODYEAR 04/16/90 19:14:50 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 28 INDEX 1 BIN 26

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
1	0.	1.39	39440 01	
2 DCE11	0.	3.69	6270072 01	
3 CHLF	0.	6.05	9843972 02	
4 TCA & CCl4	0.	6.44	14636786 03	
CHLF TCE	0.809	7.48	6724977 01	8314918.
TCE PCE	2.584	9.48	6259058 01	2421617.
TOTALS	3.393		43774305	

WARNING - MEMORY AT 2. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

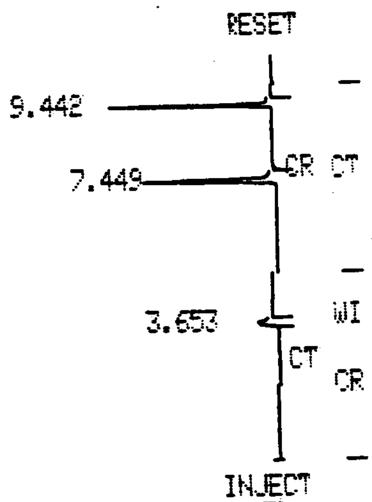
Recal 2

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 26
TIME 19:33 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.653	8.0037	11461
2		7.449	49.1602	70397
3		9.442	42.8359	61341
TOTALS:			100.0000	143199

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 196.1 OFFSET: -39

ERROR LOG:
ANNOTATION OMITTED



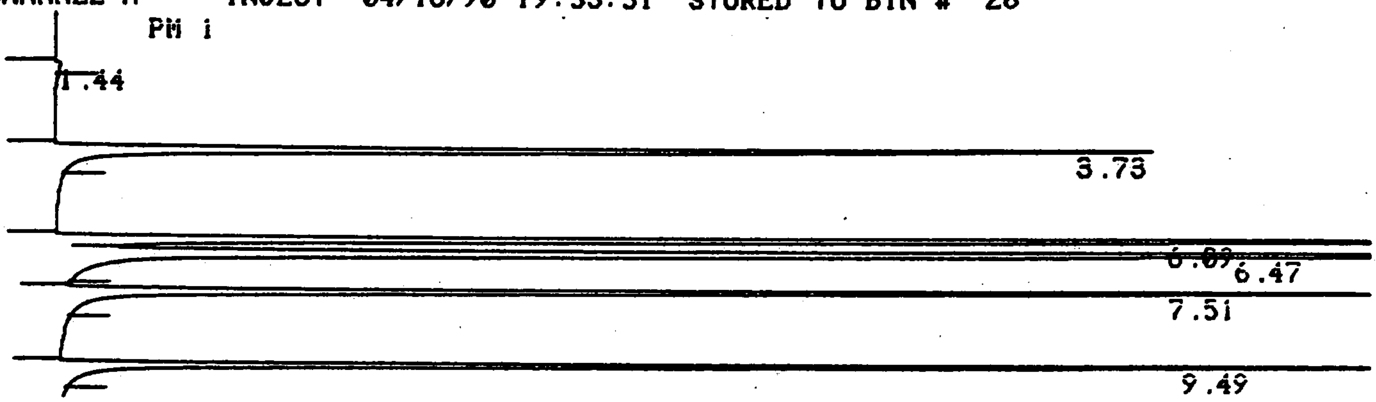
FID A 8X11 0.5 CM/M 15%

NOISE = 196.1
19:33 FAULT 59 DET B FLAMEOUT
19:33 FAULT 47 DET A FLAMEOUT
NOISE = 13.5

Calib 3

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION 3
END OF DIALOG
XF=1
SA=1
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/16/90 19:53:51 STORED TO BIN # 28



DATA SAVED TO BIN # 28

GOODYEAR 04/16/90 19:53:51 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 30 INDEX 1 BIN 28

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.44	44251	01	
DCE	1.357	3.73	6289936	01	4633648.
CHLF	1.188	6.09	9875864	02	8314918.
MIX	2.633	6.47	14825161	03	5631537.
TCE	2.699	7.51	6537520	01	2421617.
PCE	3.222	9.49	6109357	01	1896493.
TOTALS	11.099		43682089		

WARNING - MEMORY AT 7. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

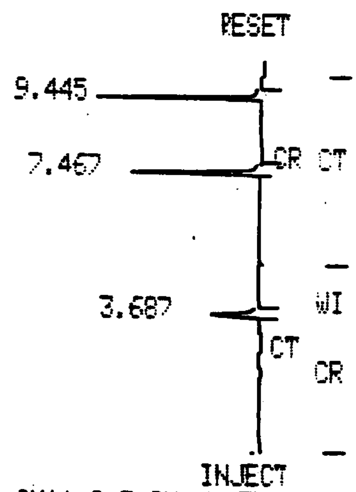
Calib3

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 27
TIME 19:48 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.687	19.2906	32224
2		7.467	42.7532	71418
3		9.445	37.9560	63404
TOTALS:			100.0000	167047

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 196.1 OFFSET: -26

ERROR LOG:
ANNOTATION OMITTED



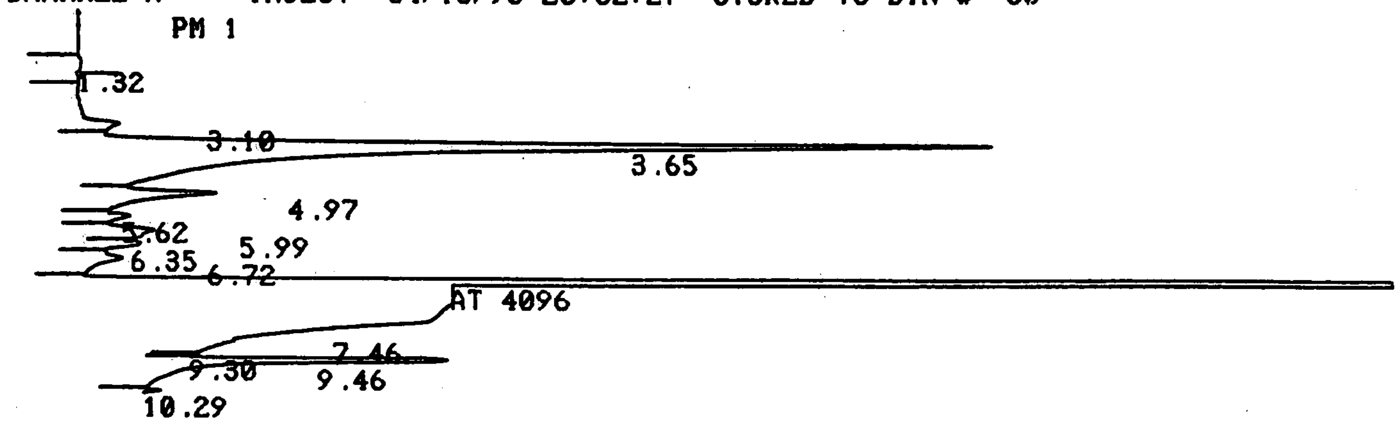
FID A 8X11 0.5 CM/M 15%

19:48 FAULT 59 DET B FLAMEOUT
19:48 FAULT 47 DET A FLAMEOUT

PG 90440 T44

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= PG90440 MP 1220 50 ML
END OF DIALOG
SA= .05
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) = 1024

CHANNEL A INJECT 04/16/90 20:32:27 STORED TO BIN # 30



DATA SAVED TO BIN # 30

GOODYEAR 04/16/90 20:32:27 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 32 INDEX 1 BIN 30

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.32	78665	01	
2	0.	3.1	1091577	02	
DCE	87.639	3.65	33168527	087569324.	
4	0.	4.97	1898851	06	
5	0.	5.62	364319	06	
CHLF	2.767	5.99	1369079	069898618.	
~~MIX~~ CCl4	2.14 ~~2.101~~	6.35	822014	067824470.	
8	0.	6.72	728566	06	
TCE	652.997	7.46	197299421	066042890.	
10	0.	9.3	1897262	06	
PCE	102.788	9.46	25669345	064994593.	
12	0.	10.29	20094	07	
TOTALS	848.292		264407720		

no 111TCA

WARNING - MEMORY AT 3. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

Calib I

456

Calib Chk.

12.) =

4

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 28
TIME 20:09 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

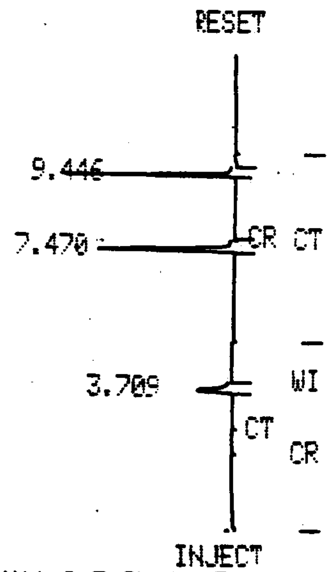
PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.709	15.3652	24906
2		7.470	45.0411	73009
3		9.446	39.5935	64179
TOTALS:			100.0000	162094

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 169.1 OFFSET: -10

ERROR LOG:
ANNOTATION OMITTED
DEFAULT TO AREA PERCENT
NO PEAK TABLE

PS= 1.

BIN 44



FID A 8X11 0.5 CM/M 15%

NOISE = 169.1
20:08 FAULT 59 DET B FLAMEOUT
20:08 FAULT 47 DET A FLAMEOUT
20:01 FAULT 59 DET B FLAMEOUT
20:01 FAULT 47 DET A FLAMEOUT

BE REPLACED

Calib I

PG 90 A 40

1.) RA=
1 (****) CI=

SCALE

128, 256, 512, 1024, 2048, 4096] (512.) =

90

90 09:51:56 STORED TO BIN # 44

ARD

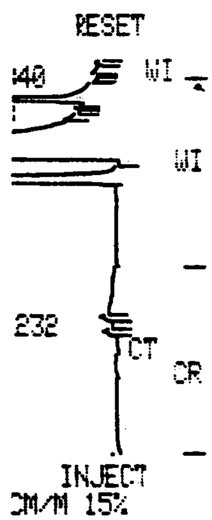
AREA COUNTS
4901
4806
836726
2266708
1927
426724
1360
1735
3544890

PEAKS: 2

1.0000000
38

04/17/90 09:51:56 CH= "A" PS= 1.

RUN 46 INDEX 1 BIN 44

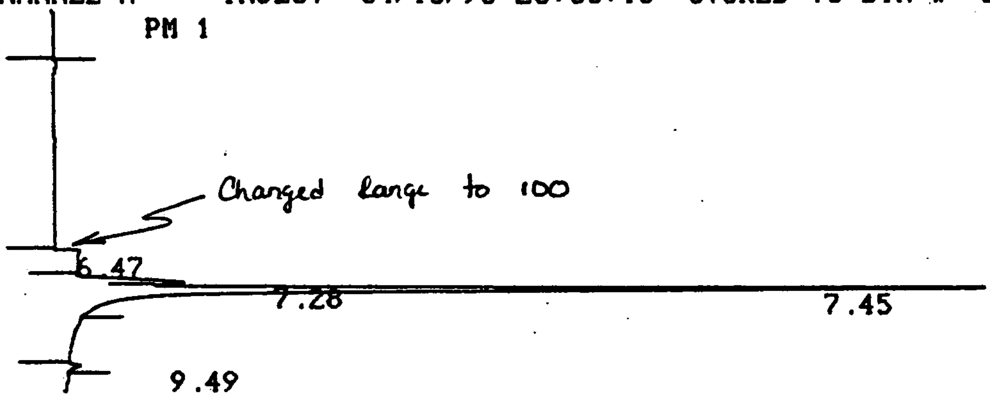


RT	AREA	BC	RF
1.45	115707	01	
3.15	144114	02	
3.79	7729028	03	7569324.
6.16	10471382	02	9898618.
6.54	16277972	02	7824470.
7.58	11962825	02	6042890.
8.78	317134	02	
9.52	9584565	03	4994593.
	56602727		

UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA328 MP 1240 50 ML 1X
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (4096) = 512

CHANNEL A INJECT 04/16/90 20:55:10 STORED TO BIN # 31



DATA SAVED TO BIN # 31

GOODYEAR 04/16/90 20:55:10 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 33 INDEX 1 BIN 31

ANALYST: SCOTT

no - 111TCA

NAME		UG/L	RT	AREA	BC	RF
~~MIX~~	Range change	~~12.666~~	~~6.47~~	495529	02	7824470.
2		0.	7.28	902597	02	
TCE	17.6	~~176.494~~	7.45	5332650	03	6042890.
PCE	.23	~~2.279~~	9.49	56929	01	4994593.
TOTALS		191.439		6787705		

Divide all results by 10 to discount affect of Δ Range.

WARNING - MEMORY AT 5. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

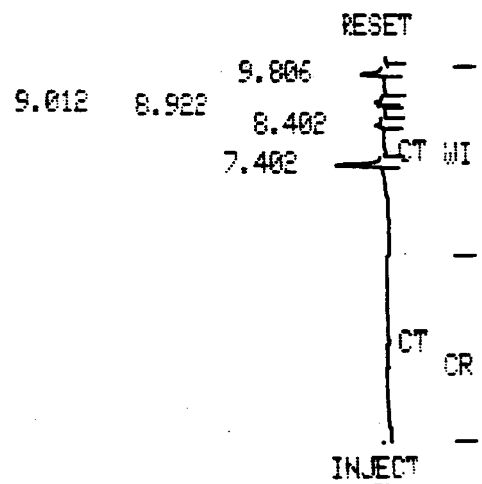
SVEA 328

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 30
TIME 20:50 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.402	52.2091	26519
2		8.402	7.7946	3959
3		8.922	2.2352	1135
4		9.012	8.7184	4428
5		9.806	29.0424	14752
TOTALS:			100.0000	50794

DETECTED PEAKS: 5 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 169.1 OFFSET: -40

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



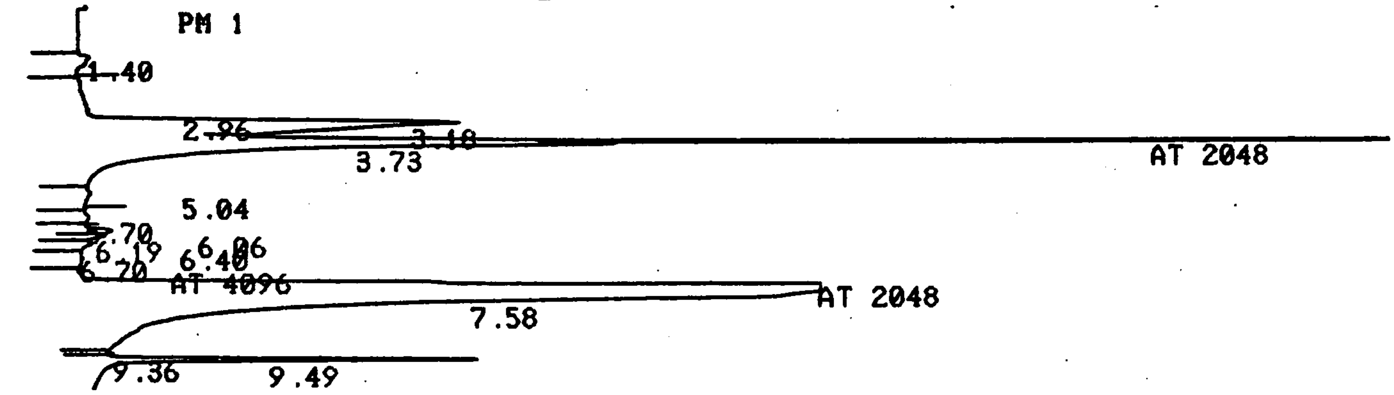
FID A 8X11 0.5 CM/M 15%

NOISE = 169.1
20:49 FAULT 59 DET B FLAMEOUT
20:49 FAULT 47 DET A FLAMEOUT
20:43 FAULT 59 DET B FLAMEOUT .
NOISE = 13.5

SVEA337

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME          SAM AMT     SCALE
SI= SVEA337  MP  1255  50 ML 1X
END OF DIALOG
SA=.05
XF=1
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 512.) =
```

CHANNEL A   INJECT 04/16/90 21:14:45 STORED TO BIN # 32



DATA SAVED TO BIN # 32

GOODYEAR   04/16/90 21:14:45   CH= "A"   PS= 1.

FILE 1.   METHOD 5.   RUN 34   INDEX 1   BIN 32

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.4	112037	01	
2	0.	2.96	238883	02	
3	0.	3.18	5478975	02	
DCE	73.546	3.73	27834585	087569324.	
5	0.	5.04	164668	05	
6	0.	5.7	229857	06	
CHLF	1.818	6.06	900091	069898618.	
8 1,1,1-TCA 6.63	0.	6.19	486779	06	
~~MIX~~ CCl4 0.69	~~0.676~~	6.4	264398	067824470.	
10	0.	6.7	95026	06	
TCE	306.042	7.58	92468906	066042890.	
12	0.	9.36	376915	06	
PCE	26.144	9.49	6528803	074994593.	
TOTALS	408.226		135179923		

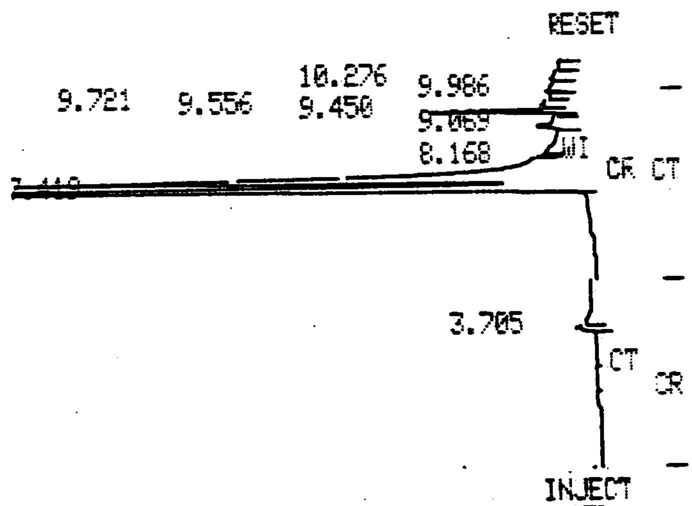
SVEA337

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 31
TIME 21:09 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.705	0.4217	6743
2		7.419	47.3221	756653
3		7.612	47.1074	753221
4		9.069	0.8037	12850
5		9.450	2.9930	47856
6		9.556	0.7084	11328
7		9.721	0.0814	1302
8		9.986	0.3841	6142
9		10.276	0.1778	2843
TOTALS:			100.0000	1598941

DETECTED PEAKS: 10 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 175.8 OFFSET: -10

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



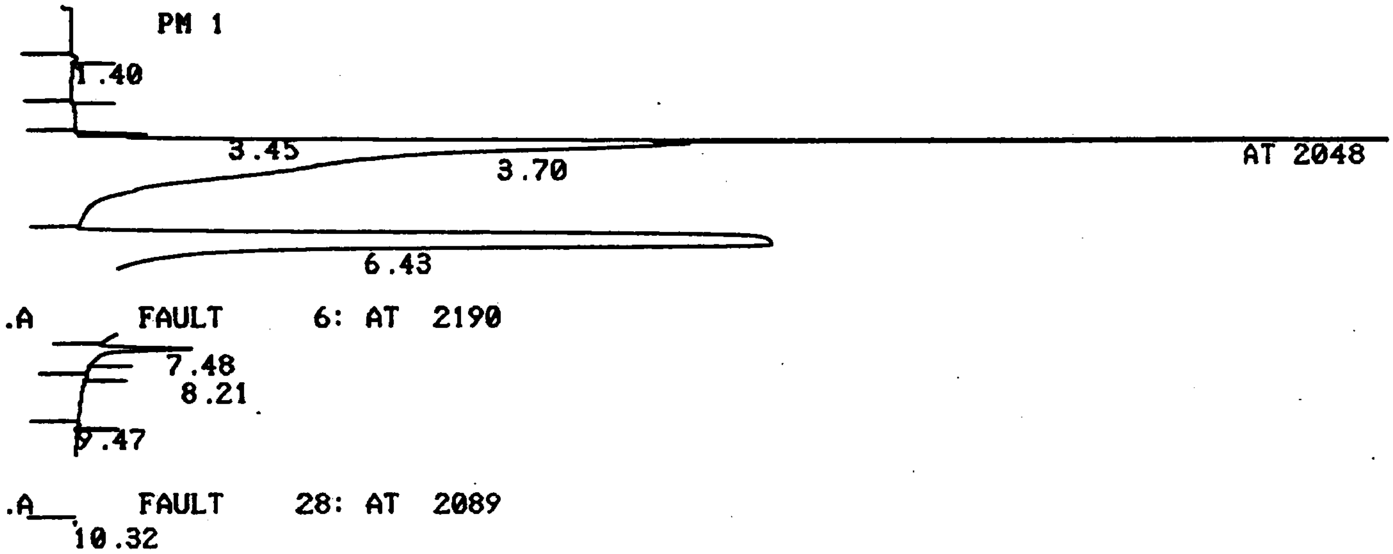
FID A 8X11 0.5 CM/M 15%

NOISE = 175.8
21:09 FAULT 59 DET B FLAMEOUT
21:09 FAULT 47 DET A FLAMEOUT

PG90520

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= PG90520 MP 1548 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/16/90 21:58:07 STORED TO BIN # 34



DATA SAVED TO BIN # 34

GOODYEAR 04/16/90 21:58:07 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 36 INDEX 1 BIN 34

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.4	26114	01	
2	0.	3.45	263382	02	
DCE	1912.245	3.7	72372027	02	7569324.
~~MIX~~ - CCl_4	1720 ~~1601.828~~	6.43	65797040	08	7824470.
TCE	62.986	7.48	1903098	05	6042890.
6	0.	8.21	37414	05	
PCE	0.966	9.47	24119	05	4994593.
8	0.	10.32	8850	01	
TOTALS	3658.025		140432044		

~~(20 111TCA)~~

WARNING - MEMORY AT 7. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

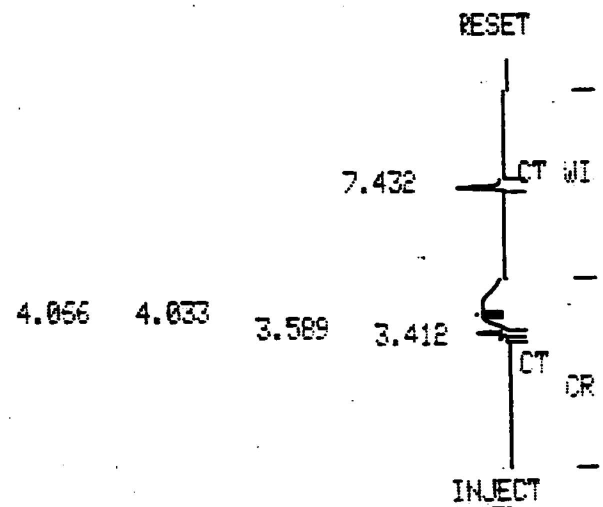
PG90520

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 33
TIME 21:53 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.589	23.3445	9988
2		4.033	16.2263	6942
3		7.432	60.4291	25855
TOTALS:			100.0000	42787

DETECTED PEAKS: 5 REJECTED PEAKS: 2
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -23

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



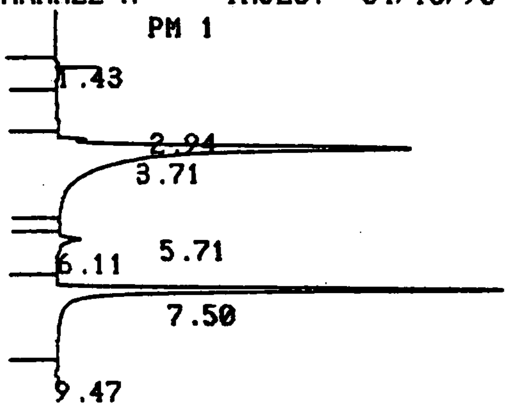
FID A 8X10 0.5 CM/M 15%

NOISE = 40.5
21:52 FAULT 59 DET B FLAMEOUT
21:52 FAULT 47 DET A FLAMEOUT
21:46 FAULT 59 DET B FLAMEOUT
NOISE = 13.5

PG90845

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME           SAM AMT     SCALE
SI= PG90845  MP  1635  50 ML  X10
END OF DIALOG
SA=.05
XF=10
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 2048) =
```

CHANNEL A   INJECT 04/16/90 22:19:44 STORED TO BIN # 35



DATA SAVED TO BIN # 35

GOODYEAR   04/16/90 22:19:44   CH= "A"   PS= 1.

FILE 1.   METHOD 5.   RUN 37   INDEX 1   BIN 35

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.43	33232	01	
2	0.	2.94	282381	02	
DCE	551.819	3.71	20884485	02	7569324.
4	0.	5.71	224453	02	
CHLF	17.902	6.11	886028	02	9898618.
TCE	389.069	7.5	11755508	02	6042890.
PCE	1.553	9.47	38782	03	4994593.
TOTALS	960.343		34104869		

(no 1,1,1-TCA)

WARNING - MEMORY AT 0. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

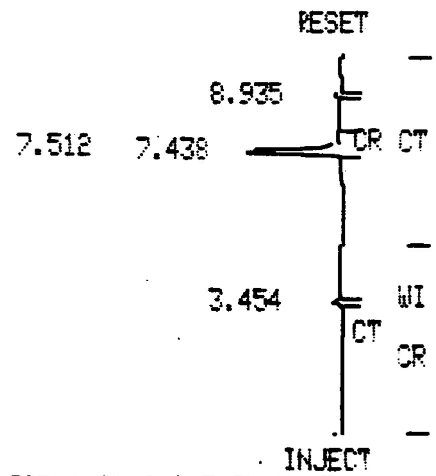
PGD845

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 34
TIME 22:14 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.454	1.3611	1415
2	TCE	7.438	53.6351	55757
3		7.512	45.0036	46784
TOTALS:			100.0000	103957

DETECTED PEAKS: 4 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -22

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



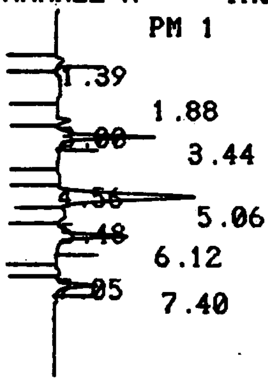
FID A 8X10 0.5 CM/M 15%

NOISE = 40.5
22:14 FAULT 59 DET B FLAMEOUT
22:14 FAULT 47 DET A FLAMEOUT

SVEA218

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA218 MP 1430 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/16/90 22:45:36 STORED TO BIN # 37



DATA SAVED TO BIN # 37

GOODYEAR 04/16/90 22:45:36 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 39 INDEX 1 BIN 37

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.39	49903	01	
2	0.	1.88	110498	02	
3	0.	3.	60250	02	
DCE	14.06	3.44	532122	03	7569324.
5	0.	4.56	41346	02	
6	0.	5.06	1360267	02	
7	0.	5.48	122862	02	
~~CHLF~~ 111TCA	63.7 ~~9.446~~	6.12	467509	03	9898618.
9	0.	7.05	46040	02	
TCE	7.424	7.4	224327	03	6042890.
TOTALS	30.93		3015124		

WARNING - MEMORY AT 4. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

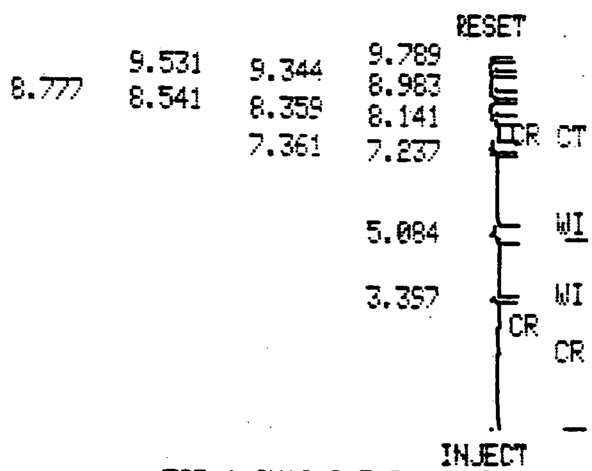
SVEA 2 18

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 36
TIME 22:40 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		5.084	28.4752	3404
2		7.361	18.7264	2238
3		8.359	8.4696	1012
4		8.777	10.4431	1248
5		8.983	8.9725	1072
6		9.344	15.1332	1809
7		9.531	9.7797	1169
TOTALS:			100.0000	11955

DETECTED PEAKS: 12 REJECTED PEAKS: 5
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -22

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



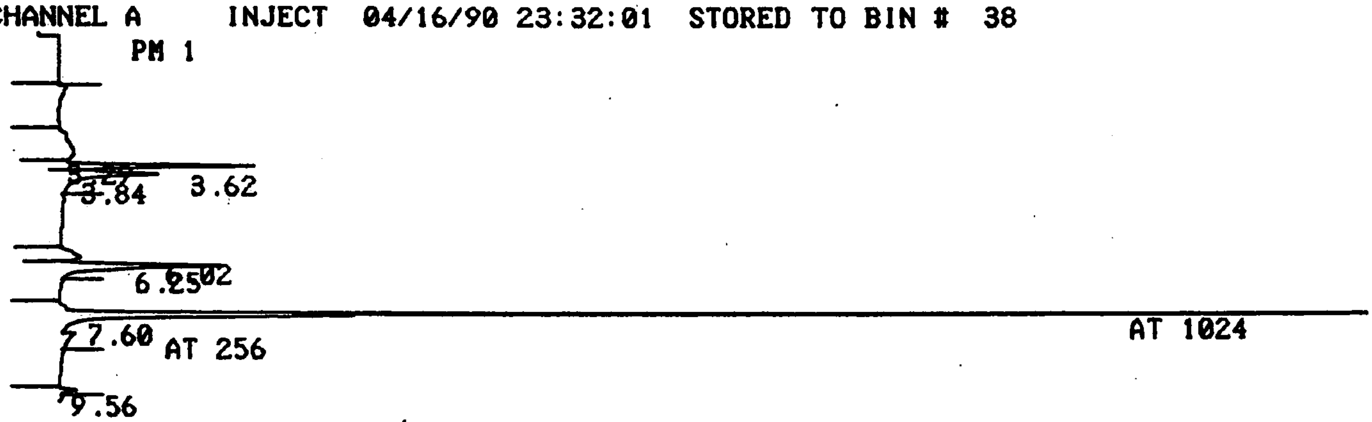
FID A 8X10 0.5 CM/M 15%

22:39 FAULT 59 DET B FLAMEOUT

SVEA28

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA28 MP 1420 50 UL X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) = 128

CHANNEL A INJECT 04/16/90 23:32:01 STORED TO BIN # 38



DATA SAVED TO BIN # 38

GOODYEAR 04/16/90 23:32:01 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 40 INDEX 1 BIN 38

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
1	0.	3.29	81776 02	
DCE	5.547	3.62	209936 02	7569324.
3	0.	3.84	172388 03	
CHLF	0.954	6.02	47200 02	9898618.
~~MIX CCl4~~ 111TCA	32.9 ~~6.174~~	6.25	241540 03	7824470.
TCE	103.69	7.6	3132957 01	6042890.
PCE	1.177	9.56	29385 01	4994593.
TOTALS	117.542		3915182	

WARNING - MEMORY AT 0. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

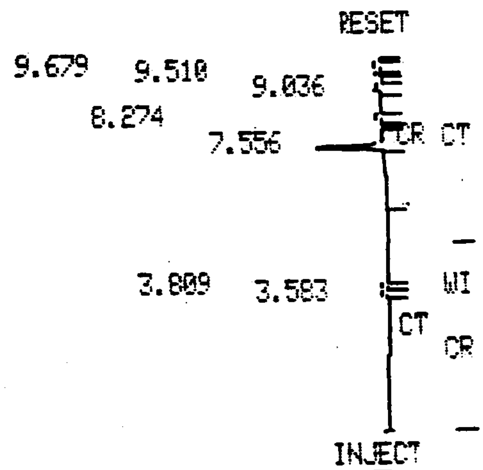
SVEA28

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 37
TIME 23:27 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.556	96.7026	44265
2		9.036	3.2973	1509
	TOTALS:		100.0000	45774

DETECTED PEAKS: 7 REJECTED PEAKS: 5
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 20.2 OFFSET: -33

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



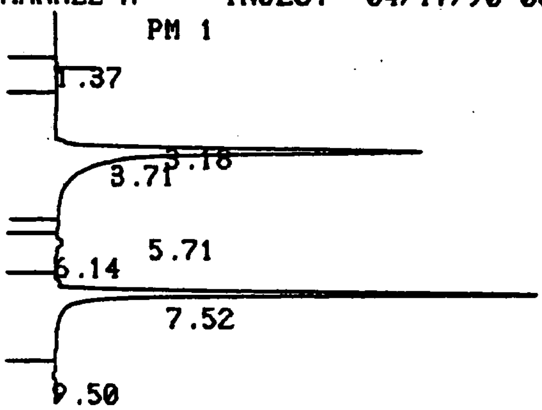
FID A 8X10 0.5 CM/M 15%

23:26 FAULT 59 DET B FLAMEOUT
23:26 FAULT 47 DET A FLAMEOUT
23:19 FAULT 59 DET B FLAMEOUT
23:19 FAULT 47 DET A FLAMEOUT
NOISE = 20.2

PG 90820

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX   NAME   SAM AMT   SCALE
SI= PG90820 MP 1720 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT   [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) = 2048

CHANNEL A   INJECT 04/17/90 00:08:21 STORED TO BIN # 40



DATA SAVED TO BIN # 40

GOODYEAR   04/17/90 00:08:21   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 42   INDEX 1   BIN 40

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.37	38717	01	
2	0.	3.18	196163	02	
DCE	464.258	3.71	17570595	02	7569324.
4	0.	5.71	189518	02	
CHLF	10.242	6.14	506886	02	9898618.
TCE	445.443	7.52	13458842	02	6042890.
PCE	3.329	9.5	83131	03	4994593.
TOTALS	923.272		32043852		

WARNING - MEMORY AT 3. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

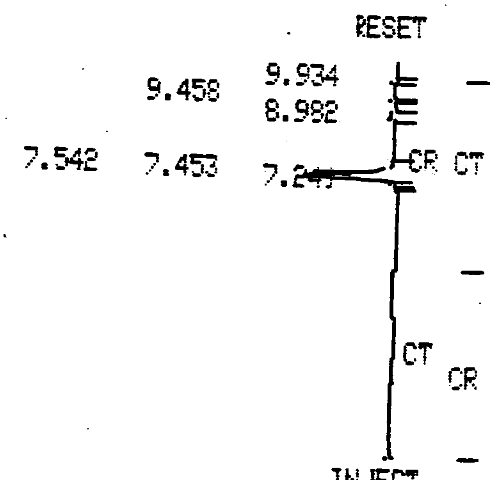
PG90820

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 39
TIME 00:03 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.453	59.3325	63619
2		7.542	40.6674	43605
TOTALS:			100.0000	107225

DETECTED PEAKS: 6 REJECTED PEAKS: 4
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -35

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



FID A 8X10 0.5 CM/M 15%

NOISE = 40.5
00:02 FAULT 59 DET B FLAMEOUT
00:02 FAULT 47 DET A FLAMEOUT

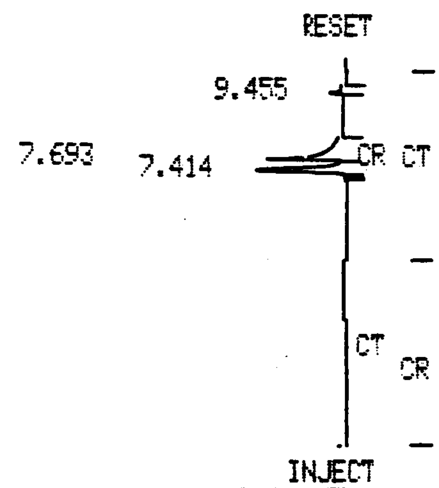
SVEA137-A

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 40
TIME 00:18 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.414	50.7267	77378
2		7.693	45.3417	69164
3	PCE	9.455	3.9315	5997
TOTALS:			100.0000	152540

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -23

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



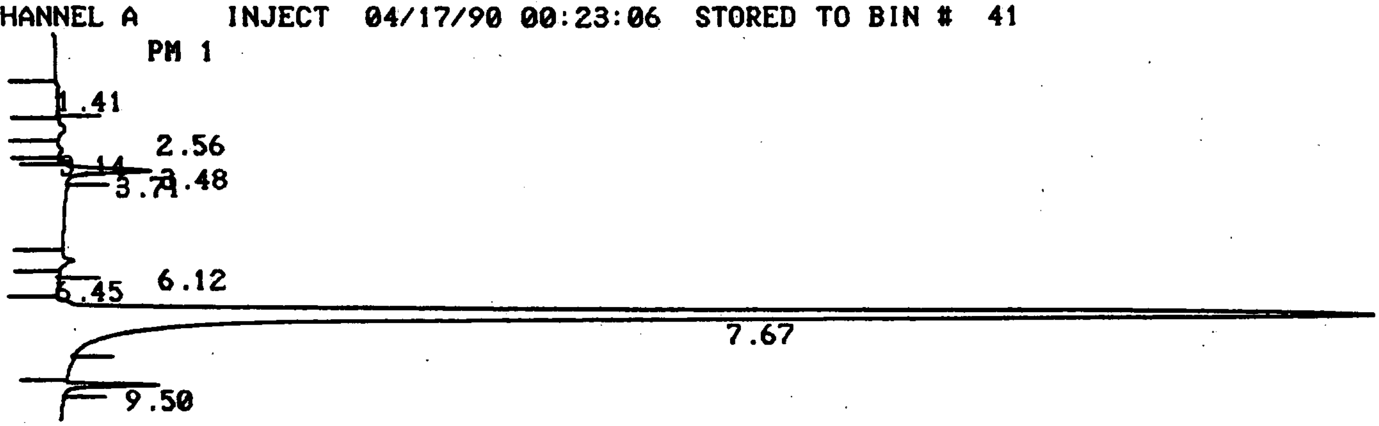
FID A 8X10 0.5 CM/M 15%

00:17 FAULT 59 DET B FLAMEOUT
00:17 FAULT 47 DET A FLAMEOUT

SVEA 137 - A

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA137 MP 1923 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (2048) =
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (2048) = 1024

CHANNEL A INJECT 04/17/90 00:23:06 STORED TO BIN # 41



DATA SAVED TO BIN # 41

GOODYEAR 04/17/90 00:23:06 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 43 INDEX 1 BIN 41

ANALYST: SCOTT

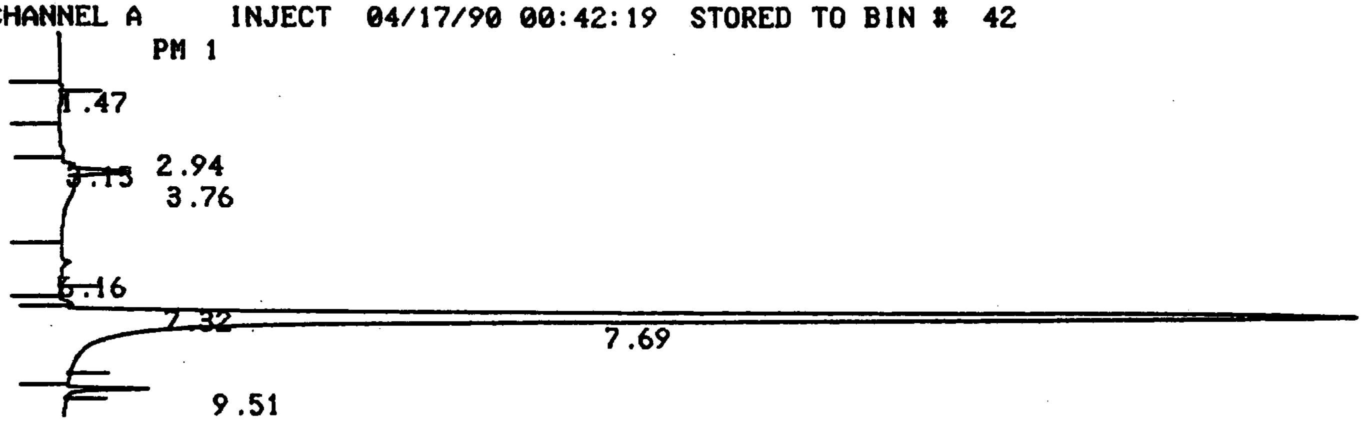
NAME	UG/L	RT	AREA	BC	RF
1	0.	1.41	107090	01	
2	0.	2.56	181407	02	
3	0.	3.14	76371	02	
4	0.	3.48	99595	02	
DCE	33.863	3.71	1281593	03	7569324.
CHLF	3.709	6.12	183559	02	9898618.
~~MIX~~ 111TCA	0.86 ~~0.161~~	6.45	6312	03	7824470.
TCE	1234.482	7.67	37299188	01	6042890.
PCE	27.279	9.5	681240	01	4994593.
TOTALS	1299.494		39916355		

WARNING - MEMORY AT 3. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

SVEA137-B

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME            SAM AMT     SCALE
SI= SVEA137-B MP  1923  50 ML  X10
END OF DIALOG
SA=.05
XF=10
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 1024) =
```

CHANNEL A   INJECT 04/17/90 00:42:19 STORED TO BIN # 42



DATA SAVED TO BIN # 42

GOODYEAR   04/17/90 00:42:19   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 44   INDEX 1   BIN 42

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
1	0.	1.47	24918 01	
2	0.	2.94	27211 02	
3	0.	3.15	94807 02	
DCE	58.383	3.76	2209594 027569324.	
CHLF	4.368	6.16	216202 039898618.	
~~TCE~~	~~5.478~~	~~7.32~~	~~165499~~ 026042890.	
7 TCE	1080 ~~0.~~	7.69	32698682 03	
PCE	22.82	9.51	569889 014994593.	
TOTALS	91.049		36006802	

(no 111TCA)

WARNING - MEMORY AT 4. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

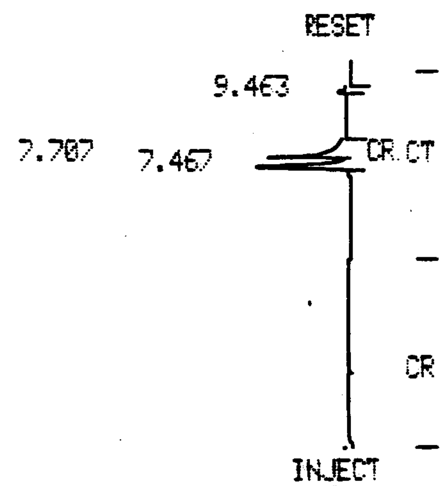
SVEA137-B

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 41
TIME 00:37 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.467	54.7678	72826
2		7.707	41.8712	55677
3	PCE	9.463	3.3608	4469
TOTALS:			100.0000	132973

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -38

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



FID A 8X10 0.5 CM/M 15%

NOISE = 47.3
00:36 FAULT 59 DET B FLAMEOUT
00:36 FAULT 47 DET A FLAMEOUT

Calib Ckk

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION CHECK
END OF DIALOG
XF=1
SA=1
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) =

CHANNEL A INJECT 04/16/90 20:14:37 STORED TO BIN # 29
PH 1

Printer head malfunctioned, Cleaned w/ MeOH.

3.74

6.47 6.09

7.51

9.48

DATA SAVED TO BIN # 29

GOODYEAR 04/16/90 20:14:37 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 31 INDEX 1 BIN 29

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF	% Recov.
DCE	0.811	3.74	6137943	0	17569324.	101 %
CHLF	0.977	6.09	9671285	0	29898618.	99 %
~~MIX~~ CCl_4	1.859	6.47	14547226	0	37824470.	100 %
TCE	1.159	7.51	7005847	0	16042890.	103
PCE	1.331	9.48	6645302	0	14994593.	102
TOTALS	6.137		44007603			

WARNING - MEMORY AT 1. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

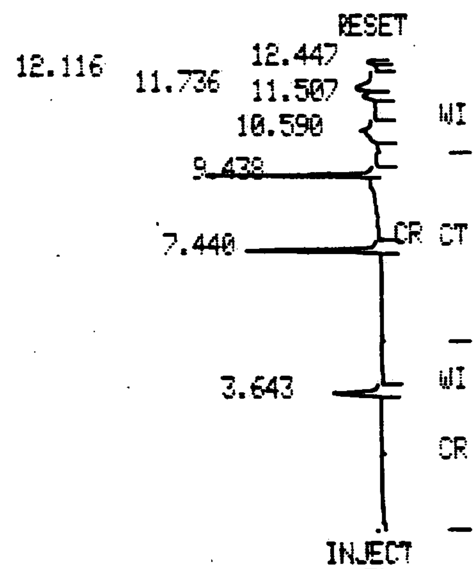
Recal 1

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 25
TIME 19:09 16 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: PERCENT

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.643	14.7212	33057
2		7.440	32.3429	72628
3		9.438	28.3379	63635
4		10.590	10.1045	22690
5		11.507	4.2542	9553
6		11.736	9.6343	21634
7		12.116	0.6046	1357
TOTALS:			100.0000	224558

DETECTED PEAKS: 8 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 169.1 OFFSET: -37

ERROR LOG:
ANNOTATION OMITTED



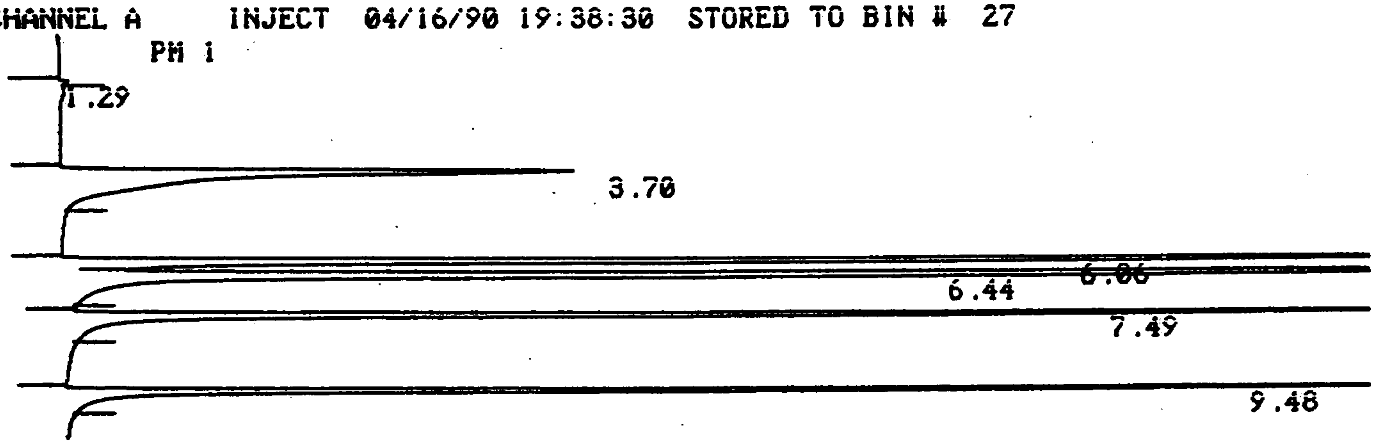
FID A 8X11 0.5 CM/M 15%

19:09 FAULT 59 DET B FLAMEOUT
19:09 FAULT 47 DET A FLAMEOUT

Recal 2

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION 2
END OF DIALOG
SA=1
XF=1
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/16/90 19:38:30 STORED TO BIN # 27



DATA SAVED TO BIN # 27

GOODYEAR 04/16/90 19:38:30 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 29 INDEX 1 BIN 27

ANALYST: SCOTT

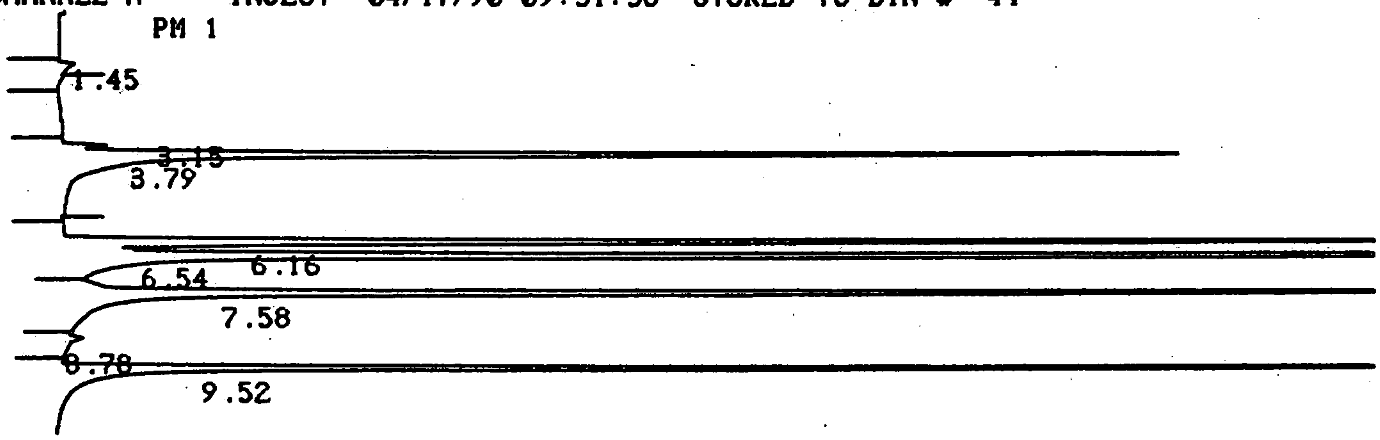
NAME	UG/L	RT	AREA BC	RF
1	0.	1.29	26716 01	
2	0.	3.7	5606370 01	
3	0.	6.06	9679058 02	
4	0.	6.44	14443330 03	
CHLF	0.847	7.49	7040614 01	8314918.
TCE	2.595	9.48	6285300 01	2421617.
TOTALS	3.442		43081388	

WARNING - MEMORY AT 4. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

Calib1

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU=".
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION 1
END OF DIALOG
SA=1
XF=1
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) =

CHANNEL A INJECT 04/17/90 09:51:56 STORED TO BIN # 44



DATA SAVED TO BIN # 44

GOODYEAR 04/17/90 09:51:56 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 46 INDEX 1 BIN 44

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC RF
1	0.	1.45	115707	01
2	0.	3.15	144114	02
DCE	1.021	3.79	7729028	037569324.
CHLF	1.058	6.16	10471382	029898618.
MIX	2.08	6.54	16277972	027824470.
TCE	1.98	7.58	11962825	026042890.
7	0.	8.78	317134	02
PCE	1.919	9.52	9584565	034994593.
TOTALS	8.058		56602727	

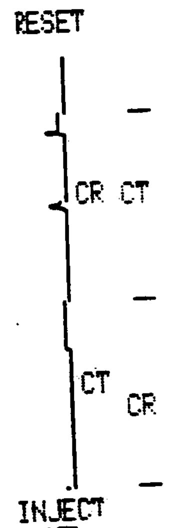
WARNING - MEMORY AT 2. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

Calib 1

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 43
TIME 09:47 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

DETECTED PEAKS: 0 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 38840. OFFSET: -24

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
NO PEAKS



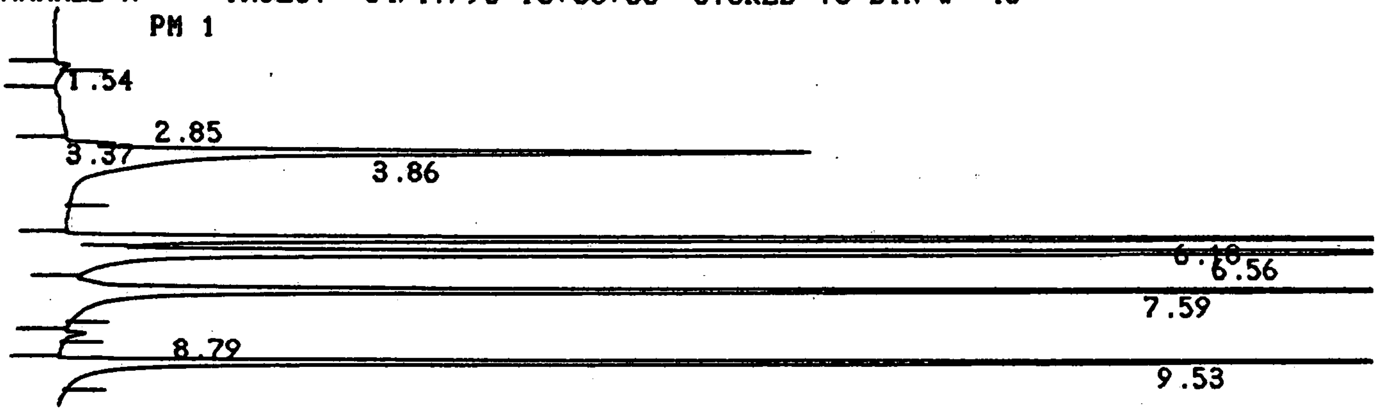
FID A 8X10 0.5 CM/M 15%

09:46 FAULT 59 DET B FLAMEOUT
09:46 FAULT 47 DET A FLAMEOUT
NOISE = 38840.
09:39 FAULT 59 DET B FLAMEOUT

Cal#2 47/

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION 2
END OF DIALOG
SA=1
XF=1
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) =

CHANNEL A INJECT 04/17/90 10:08:33 STORED TO BIN # 45



DATA SAVED TO BIN # 45

GOODYEAR 04/17/90 10:08:33 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 47 INDEX 1 BIN 45

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.54	56878	01	
2	0.	2.85	69086	02	
3	0.	3.37	154458	02	
DCE	0.95	3.86	7190974	03	7569324.
CHLF	0.974	6.18	9640188	02	9898618.
MIX	1.905	6.56	14907346	08	7824470.
TCE	1.738	7.59	10502741	05	6042890.
8	0.	8.79	112204	01	
PCE	1.793	9.53	8956966	01	4994593.
TOTALS	7.36		51590841		

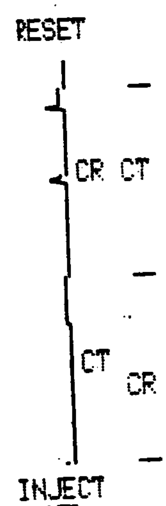
WARNING - MEMORY AT 5. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

Calib 2

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 44
TIME 10:03 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

DETECTED PEAKS: 0 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 38840. OFFSET: -18

ERROR LOG:
COL TEMP
ANNOTATION OMITTED
FACTORS ZERO
NO PEAKS



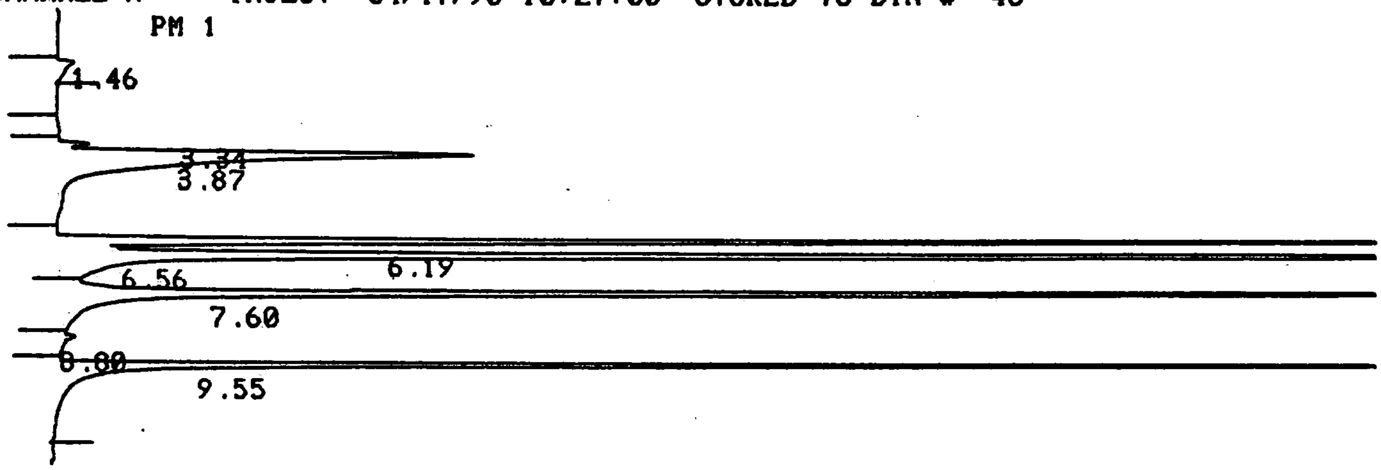
FID A 8X10 0.5 CM/M 15%

10:03 FAULT 59 DET B FLAMEOUT
10:03 FAULT 47 DET A FLAMEOUT

Calib 3

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION 3
END OF DIALOG
SA=1
XF=1
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) =

CHANNEL A INJECT 04/17/90 10:27:00 STORED TO BIN # 46



DATA SAVED TO BIN # 46

GOODYEAR 04/17/90 10:27:00 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 48 INDEX 1 BIN 46

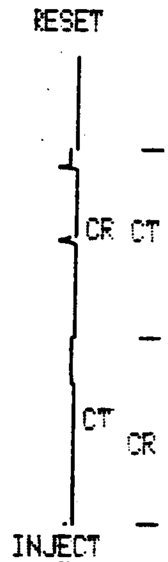
ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.46	211121	01	
2	0.	3.34	44187	02	
DCE	0.863	3.87	6532452	08	7569324.
CHLF	0.915	6.19	9056159	06	9898618.
MIX	1.912	6.56	14961607	06	7824470.
TCE	1.83	7.6	11056981	06	6042890.
7	0.	8.8	321614	06	
PCE	1.861	9.55	9293644	07	4994593.
TOTALS	7.381		51477765		

WARNING - MEMORY AT 1. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

Calib 3

```
VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2                    RUN 45
TIME 10:22                  17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

DETECTED PEAKS:    0   REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000  DIVISOR: 1.0000000
NOISE: 38840.          OFFSET: -24

ERROR LOG:
   ANNOTATION OMITTED
   FACTORS ZERO
   NO PEAKS
```



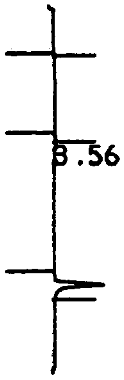
FID A 8X10 0.5 CM/M 15%

```
10:21 FAULT 59 DET B FLAMEOUT
10:21 FAULT 47 DET A FLAMEOUT
10:19 FAULT 59 DET B FLAMEOUT
10:19 FAULT 47 DET A FLAMEOUT
```

SVEA 117

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA117 MP 1948 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/17/90 11:06:47 STORED TO BIN # 48



.A FAULT 28: AT 2089

DATA SAVED TO BIN # 48

D

GOODYEAR 04/17/90 11:06:47 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 50 INDEX 1 BIN 48

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
DCE	0.237	3.56	10587 01	8938514.
TCE	5.931	7.54	295891 01	9976949.
TOTALS	6.168		306478	

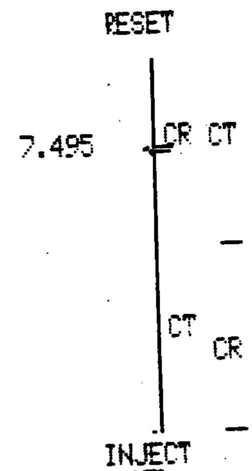
WARNING - MEMORY AT 0. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

SVEA117

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 47
TIME 11:01 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

DETECTED PEAKS: 1 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -13

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
ALL PEAKS REJECTED



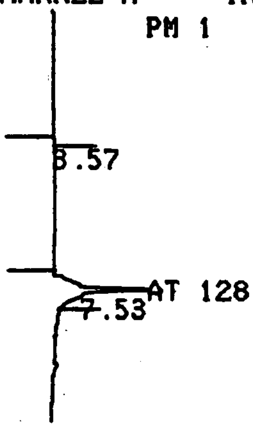
FID A 8X10 0.5 CM/M 15%

11:01 FAULT 59 DET B FLAMEOUT
11:01 FAULT 47 DET A FLAMEOUT

SVEA127 462

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA127 MP 1937 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/17/90 11:20:28 STORED TO BIN # 49



.A FAULT 28: AT 2089

DATA SAVED TO BIN # 49

GOODYEAR 04/17/90 11:20:28 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 51 INDEX 1 BIN 49

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
DCE	0.189	3.57	8426	01	8938514.
TCE	4.531	7.53	226044	01	9976949.
TOTALS	4.72		234470		

WARNING - MEMORY AT 6. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

SVEA127

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 48
TIME 11:15 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

DETECTED PEAKS: 0 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -16

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
NO PEAKS

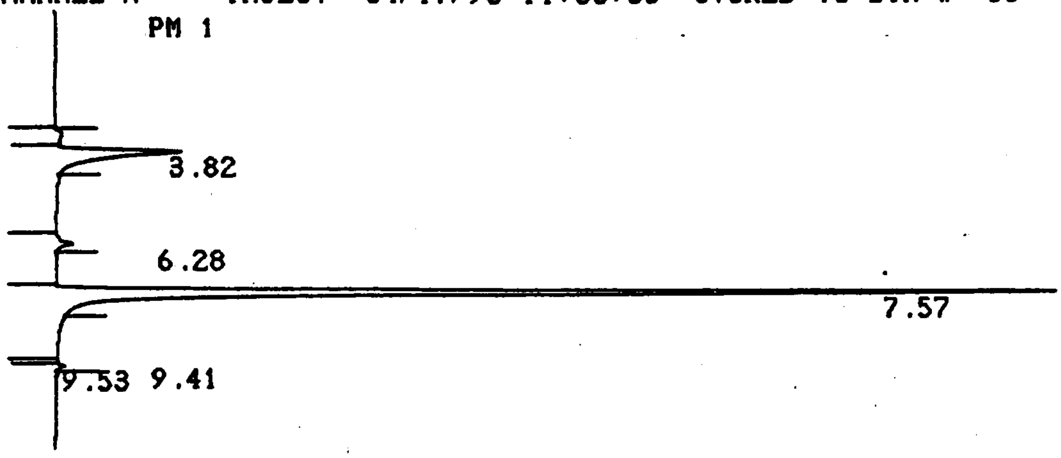
FID A 8X10 0.5 CM/M 15%

11:15 FAULT 59 DET B FLAMEOUT
11:15 FAULT 47 DET A FLAMEOUT
11:15 FAULT 59 DET B FLAMEOUT
11:15 FAULT 47 DET A FLAMEOUT

PG 90345 463

SAMPLE TABLE
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= PG90345 MP 1800 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (128.) = 512

CHANNEL A INJECT 04/17/90 11:35:55 STORED TO BIN # 50



DATA SAVED TO BIN # 50

GOODYEAR 04/17/90 11:35:55 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 52 INDEX 1 BIN 50

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
DCE	29.186	3.82	1304392	01	8938514.
~~CHLF~~ 111TCA 25.1	~~2.267~~	6.28	111339	01	9820784.
TCE	125.446	7.57	6257820	01	9976949.
4	0.	9.41	7656	02	
PCE	0.967	9.53	34530	03	7137224.
TOTALS	157.866		7715737		

WARNING - MEMORY AT 1. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

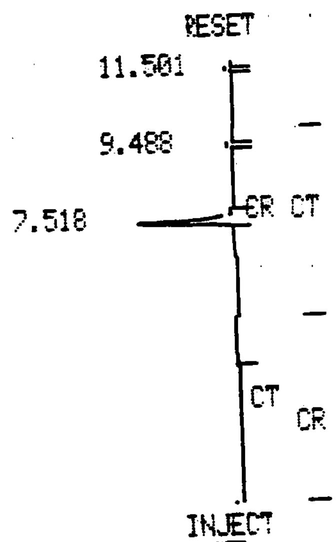
PG 90 345

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 49
TIME 11:31 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.518	100.0000	82427
	TOTALS:		100.0000	82427

DETECTED PEAKS: 3 REJECTED PEAKS: 2
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -15

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



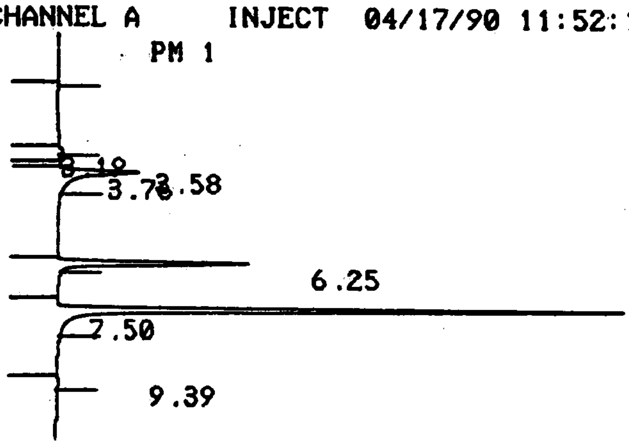
FID A 8X10 0.5 CM/M 15%

11:30 FAULT 59 DET B FLAMEOUT
11:30 FAULT 47 DET A FLAMEOUT

PG90320

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= PG90320 MP 50 ML 1825 X10
END OF DIALOG
SA=.05
XF=10
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) =

CHANNEL A INJECT 04/17/90 11:52:19 STORED TO BIN # 51



DATA SAVED TO BIN # 51

GOODYEAR 04/17/90 11:52:19 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 53 INDEX 1 BIN 51

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
1	0.	3.19	26496 01	
2	0.	3.58	5456 02	
DCE	14.359	3.76	641749 038938514.	
~~CHLF~~ 111TCA 208	~~10.849~~	6.25	925558 019820784.	
TCE	54.981	7.5	2742721 019976949.	
PCE	0.665	9.39	23721 017137224.	
TOTALS	88.854		4365701	

WARNING - MEMORY AT 5. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

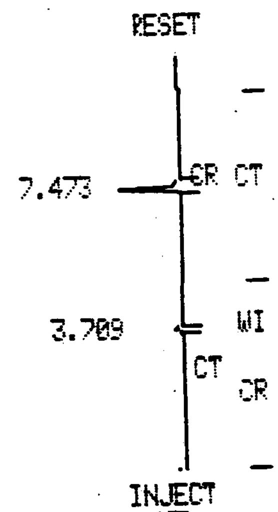
PG90320

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 50
TIME 11:47 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.473	100.0000	33704
TOTALS:			100.0000	33704

DETECTED PEAKS: 2 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -25

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



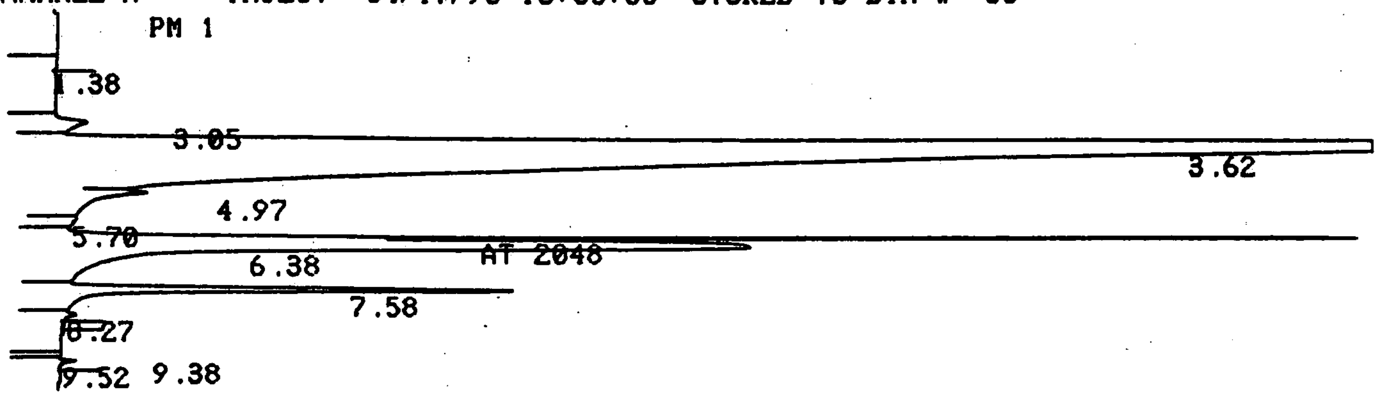
FID A 8X10 0.5 CM/M 15%

11:47 FAULT 59 DET B FLAMEOUT
11:47 FAULT 47 DET A FLAMEOUT

PG90545 468

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= PG90545 MP 25 ML 1153 X10
END OF DIALOG
SA=.025
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/17/90 13:05:35 STORED TO BIN # 55



.A FAULT 28: AT 2089

DATA SAVED TO BIN # 55

GOODYEAR 04/17/90 13:05:35 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 57 INDEX 1 BIN 55

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.38	19697	01	
2	0.	3.05	344464	02	
DCE	2395.78	3.62	53536778	02	8938514.
4	0.	4.97	1048413	02	
~~CHLF~~	2068 ~~20700.~~ ~~3.098~~	5.7	76068	02	9820784. poor form
~~MIX CCl4~~ 111TCA	~~2203.219~~	6.38	45927861	08	8338320.
TCE	453.808	7.58	11319044	06	9976949.
8	0.	8.27	227011	07	
9	0.	9.38	5039	02	
PCE	13.961	9.52	249111	03	7137224.

3.62

TOTALS 5069.866 112753486

WARNING - MEMORY AT 1. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

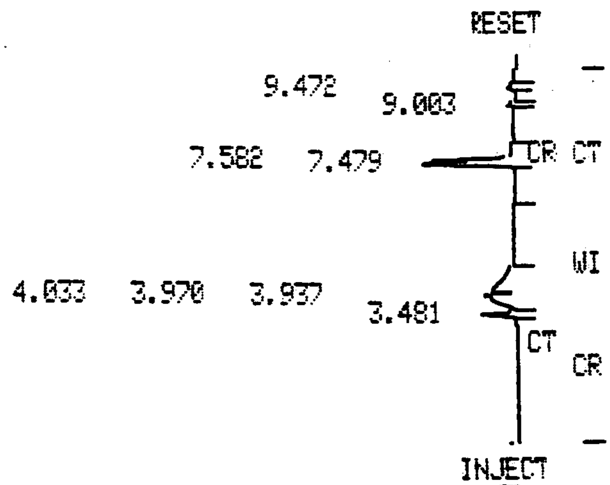
PG90545

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 54
TIME 13:00 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		3.481	7.4869	16568
2		3.937	17.7590	39301
3		3.970	4.6417	10272
4		4.033	24.0418	53205
5		7.479	27.9127	61771
6		7.582	17.3606	38419
7		9.472	0.7968	1763
TOTALS:			100.0000	221301

DETECTED PEAKS: 8 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -12

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



FID A 8X10 0.5 CM/M 15%

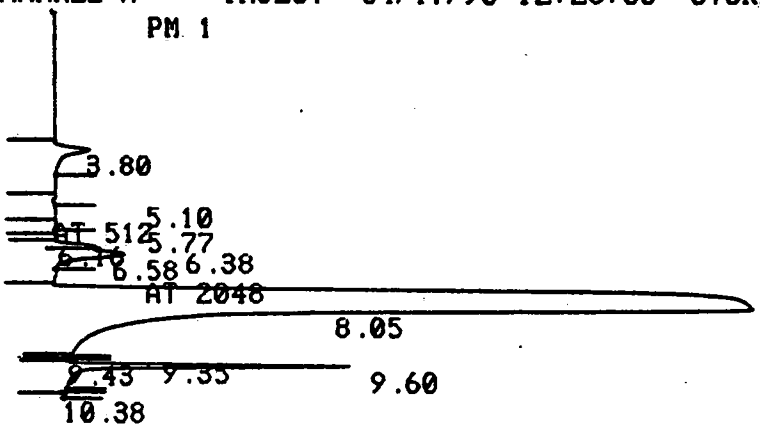
13:00 FAULT 59 DET B FLAMEOUT
13:00 FAULT 47 DET A FLAMEOUT

PG90420 A

40b

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME            SAM AMT     SCALE
SI= PG90420  25 ML   MP  1050  X10
END OF DIALOG
SA=.025
XF=10
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 128.) = 512
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 512.) = 2056

 .A       FAULT     6: AT  2190
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 512.) = 2056

 .A       FAULT     6: AT  2190
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 512.) = 2048
```

CHANNEL A   INJECT 04/17/90 12:28:30 STORED TO BIN # 53



DATA SAVED TO BIN # 53

GOODYEAR   04/17/90 12:28:30   CH= "A"   PS= 1.

FILE 1.   METHOD 5.   RUN 55   INDEX 1   BIN 53

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
DCE	67.56	3.8	1509705	018938514.	
2	0.	5.1	19483	01	
3	0.	5.77	13706	01	
CHLF	0.686	6.16	16864	029820784.	
5 111TCA	~~125~~ ~~0.~~	~~6.30~~	277239	02	poor form
~~MIX~~ CCl4	35.2 ~~37.851~~	6.58	778595	038338320.	
TCE	3353.171	8.05	83636057	089976949.	
8	0.	9.35	1101	05	
9	0.	9.43	616	05	
PCE	268.179	9.6	4785124	057137224.	
11	0.	10.38	9646	01	

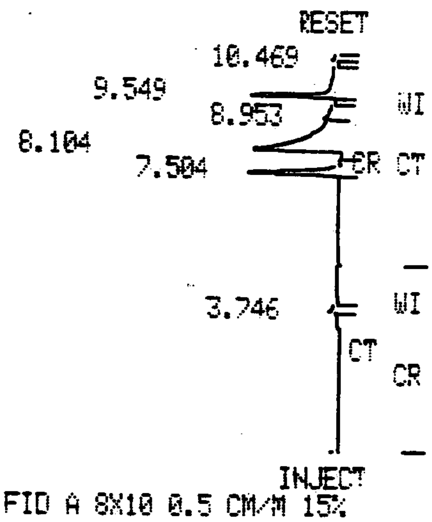
PG 90420 A

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 52
TIME 12:23 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	DCE	3.746	0.4414	1496
2	TCE	7.504	21.1065	71561
3		8.104	58.3618	197874
4		8.953	2.7174	9213
5	PCE	9.549	17.3727	58901
TOTALS:			100.0000	339047

DETECTED PEAKS: 6 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -19

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



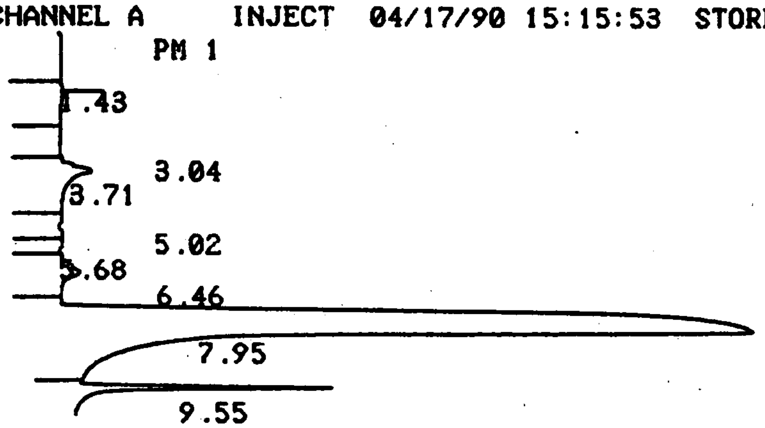
FID A 8X10 0.5 CM/M 15%

12:23 FAULT 59 DET B FLAMEOUT
12:23 FAULT 47 DET A FLAMEOUT

PG 90420 B

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= PG90420 MP 25 ML X10 1355
END OF DIALOG
SA=.025
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (1024) = 2048

CHANNEL A INJECT 04/17/90 15:15:53 STORED TO BIN # 62



DATA SAVED TO BIN # 62

GOODYEAR 04/17/90 15:15:53 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 64 INDEX 1 BIN 62

ANALYST: SCOTT

SAMPLE 1 BIN 62 NAME ARUN0062

NAME		UG/L	RT	AREA	BC	RF
1		0.	1.43	27700	01	
2		0.	3.04	57462	02	
DCE	99	~~0.248~~	3.71	2213150	088938514.	
4		0.	5.02	29611	06	
CHLF	1.00	~~0.002~~	5.68	24577	069820784.	
~~MIX~~ CCl_4	64.0~~624~~	~~0.157~~	6.46	1306504	068338320.	
TCE	3460	~~8.658~~	7.95	86381455	069976949.	
PCE	307	~~0.767~~	9.55	5472996	077137224.	
TOTALS		9.832		95513455		

WARNING - MEMORY AT 0. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

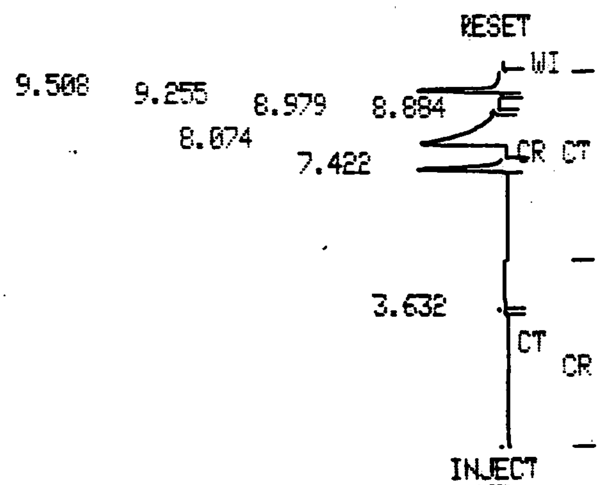
PG 90420-B

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 61
TIME 15:10 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.422	19.9912	69553
2		8.074	58.4316	203296
3		8.884	1.7297	6018
4		8.979	2.2207	7726
5		9.255	0.4778	1662
6	PCE	9.508	17.1486	59663
TOTALS:			100.0000	347921

DETECTED PEAKS: 7 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 33.8 OFFSET: -28

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



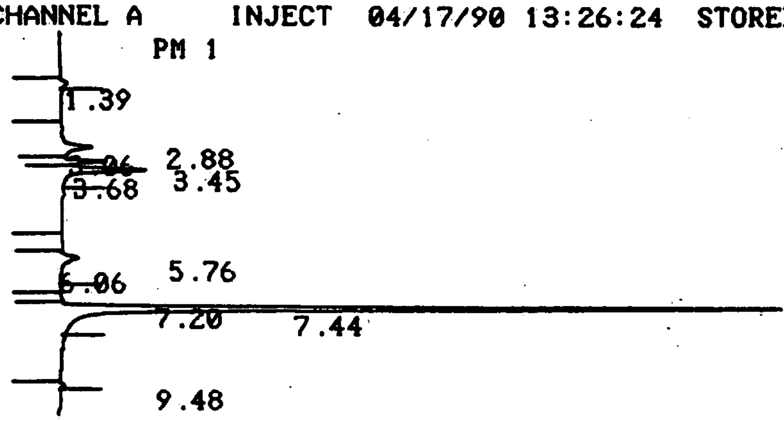
FID A 8X10 0.5 CM/M 15%

NOISE = 33.8
15:10 FAULT 59 DET B FLAMEOUT
15:10 FAULT 47 DET A FLAMEOUT

SVEA318

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME            SAM AMT     SCALE
SI= SVEA318  MP  1124  50 ML  X10
END OF DIALOG
SA=.05
XF=10
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 2048) = 512
```

CHANNEL A   INJECT 04/17/90 13:26:24 STORED TO BIN # 56



.A   FAULT   28: AT 2089

DATA SAVED TO BIN # 56

GOODYEAR   04/17/90 13:26:24   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 58   INDEX 1   BIN 56

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.39	31383	01	
2	0.	2.88	34730	02	
3	0.	3.06	242939	02	
4	0.	3.45	209709	02	
DCE	11.844	3.68	529345	03	8938514.
6	0.	5.76	23734	02	
CHLF	3.467	6.06	170256	03	9820784.
8	0.	7.2	21192	02	
TCE	72.272	7.44	3605231	03	9976949.
PCE	0.549	9.48	19601	01	7137224.
TOTALS	88.132		4888120		

WARNING - MEMORY AT 4. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

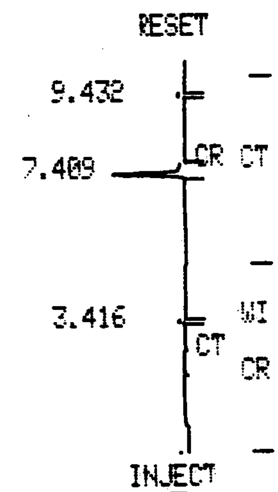
SVEA318

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 55
TIME 13:21 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.409	100.0000	43510
TOTALS:			100.0000	43510

DETECTED PEAKS: 3 REJECTED PEAKS: 2
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -39

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



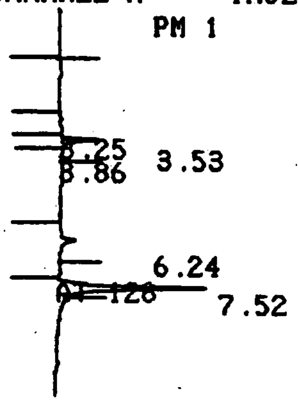
FID A 8X10 0.5 CM/M 15%

NOISE = 40.5
13:20 FAULT 59 DET B FLAMEOUT
13:20 FAULT 47 DET A FLAMEOUT

SVEA227

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA227 MP 1104 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (512.) =

CHANNEL A INJECT 04/17/90 13:40:53 STORED TO BIN # 57



DATA SAVED TO BIN # 57

GOODYEAR 04/17/90 13:40:53 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 59 INDEX 1 BIN 57

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
1	0.	3.25	35400 02	
2	0.	3.53	168644 02	
DCE	0.366	3.86	16343 038938514.	
CHLF	2.442	6.24	119931 019820784.	
TCE	4.153	7.52	207168 019976949.	
TOTALS	6.961		547486	

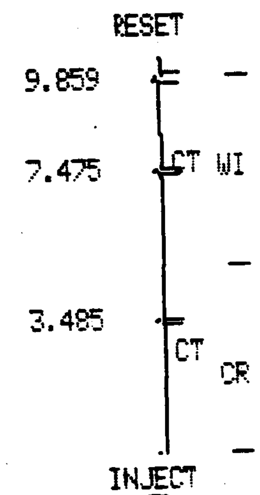
WARNING - MEMORY AT 1. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

5VEA227

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 56
TIME 13:35 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

DETECTED PEAKS: 3 REJECTED PEAKS: 3
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -13

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
ALL PEAKS REJECTED



FID A 8X10 0.5 CM/M 15%

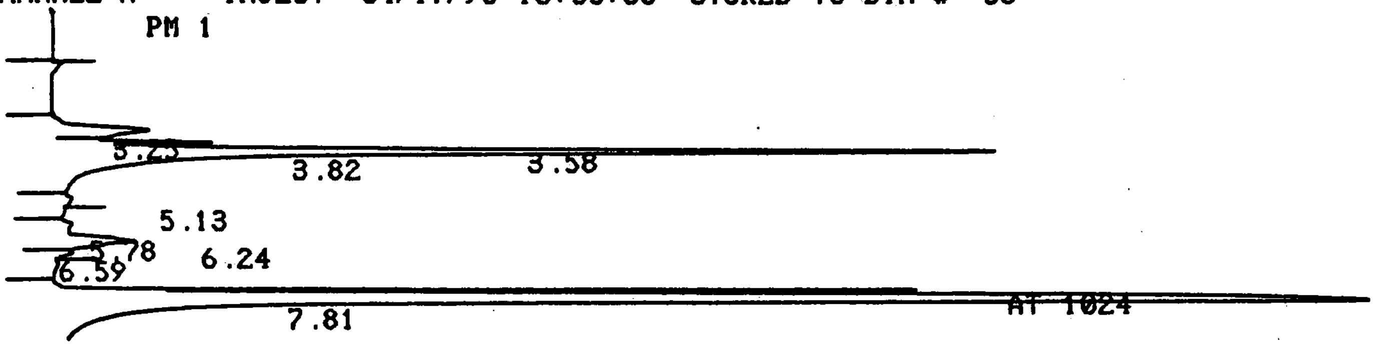
13:35 FAULT 59 DET B FLAMEOUT
13:35 FAULT 47 DET A FLAMEOUT

4/1

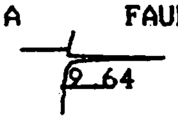
SVEA 237

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX   NAME   SAM AMT   SCALE
SI= SVEA237 MP 1111 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT   [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (128.) =

CHANNEL A   INJECT 04/17/90 13:55:30 STORED TO BIN # 58



.A   FAULT   6: AT 2190



DATA SAVED TO BIN # 58

GOODYEAR   04/17/90 13:55:30   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 60   INDEX   1   BIN 58

ANALYST: SCOTT

NAME		UG/L	RT	AREA	BC	RF
1		0.	3.25	297737	02	
2		0.	3.58	176888	02	
DCE		48.838	3.82	2182675	02	8938514.
4		0.	5.13	17298	03	
5		0.	5.78	33125	02	
CHLF		4.106	6.24	201656	02	9820784.
~~MIX~~ CCl_4	0.56	~~0.545~~	6.59	22711	03	8338320.
TCE		755.63	7.81	37694403	02	9976949.
PCE		27.427	9.64	978780	03	7137224.
TOTALS		836.546		41605273		

WARNING - MEMORY AT 1. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

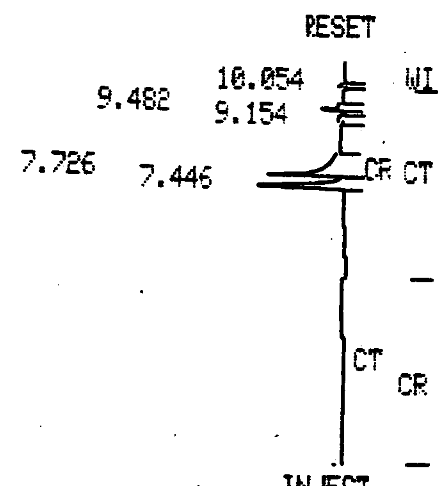
SVEA237

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 57
TIME 13:50 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.446	48.5309	71971
2		7.726	46.7580	69342
3	PCE	9.482	4.7110	6986
TOTALS:			100.0000	148300

DETECTED PEAKS: 5 REJECTED PEAKS: 2
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -14

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT

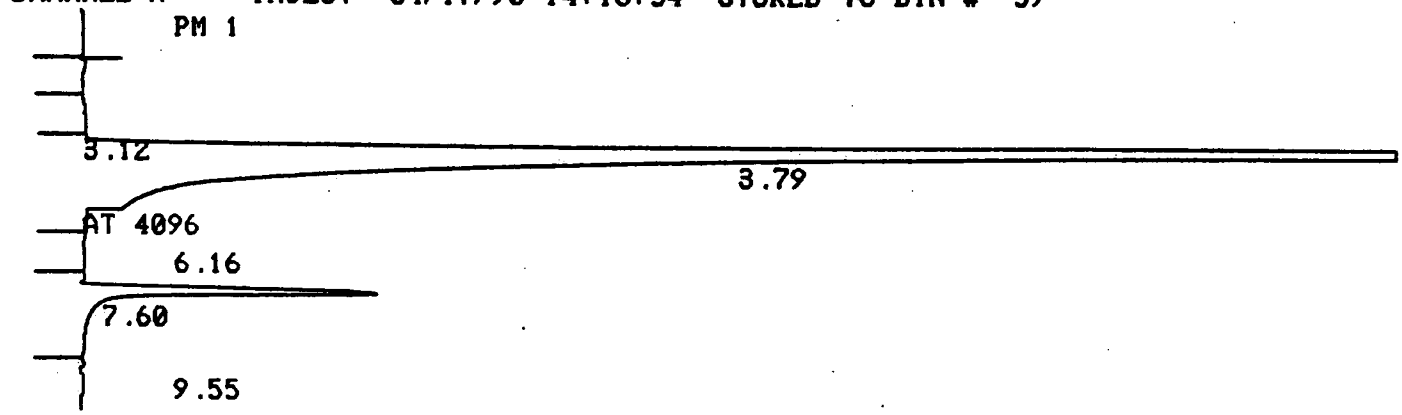


FID A 8X10 0.5 CM/M 15%

13:50 FAULT 59 DET B FLAMEOUT
13:50 FAULT 47 DET A FLAMEOUT

SAMPLE TABLE...   071060 - A
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX   NAME   SAM AMT   SCALE
SI= 091060 MP 1300 50 ML X10SN=" SA= .05
.A   FAULT   11: AT 9520
SA=.05
XF=10
AT   [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (1024) = 512

CHANNEL A   INJECT 04/17/90 14:18:54 STORED TO BIN # 59



DATA SAVED TO BIN # 59

GOODYEAR   04/17/90 14:18:54   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 61   INDEX 1   BIN 59

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	3.12	105426	02	
DCE	1033.875	3.79	46206542	02	8938514.
CHLF	15.003	6.16	736712	02	9820784.
TCE	516.972	7.6	25788983	02	9976949.
PCE	10.954	9.55	390931	03	7137224.
TOTALS	1576.804		73228594		

- Not detected by PID, so possibly DCM

WARNING - MEMORY AT 0. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

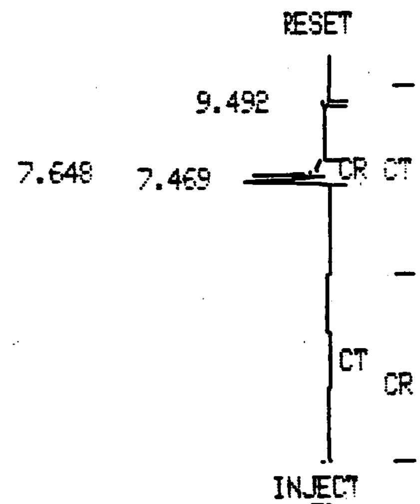
091060-A

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 58
TIME 14:14 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.469	63.6305	66363
2		7.648	36.3694	37931
TOTALS:			100.0000	104294

DETECTED PEAKS: 3 REJECTED PEAKS: 1
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -32

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



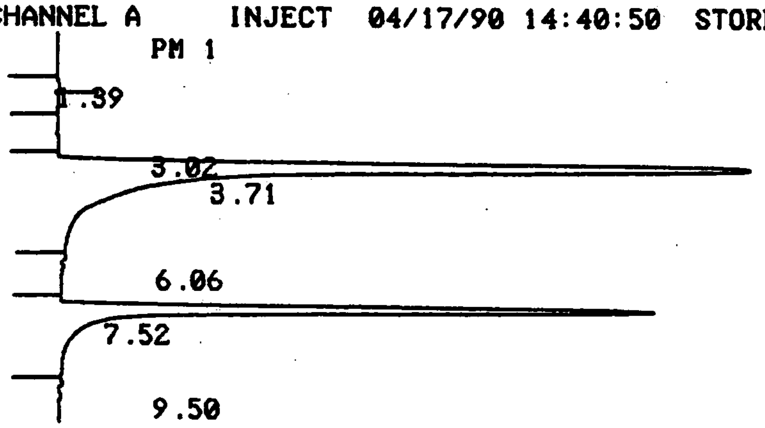
FID A 8X10 0.5 CM/M 15%

NOISE = 40.5
14:13 FAULT 59 DET B FLAMEOUT
14:13 FAULT 47 DET A FLAMEOUT
14:07 FAULT 59 DET B FLAMEOUT
NOISE = 20.2

091060-B

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L ) CU="
SAM IX    NAME            SAM AMT     SCALE
SI= 091060  MP  1300  50 ML  X10SN=" SA= XF=
.A      FAULT   100: AT  9535
SA=.05
XF=10
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 4096) = 2048
```

CHANNEL A   INJECT 04/17/90 14:40:50 STORED TO BIN # 60



DATA SAVED TO BIN # 60

GOODYEAR   04/17/90 14:40:50   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 62   INDEX 1   BIN 60

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	1.39	58889	01	
2	0.	3.02	156240	02	
~~DCE~~	1144.163	3.71	51135576	02	8938514.
CHLF	15.918	6.06	781623	02	9820784.
TCE	518.58	7.52	25869248	02	9976949.
PCE	6.489	9.5	231581	03	7137224.
TOTALS	1685.15		78233157		

Not detected by PID. Possibly DCM

WARNING - MEMORY AT 5. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

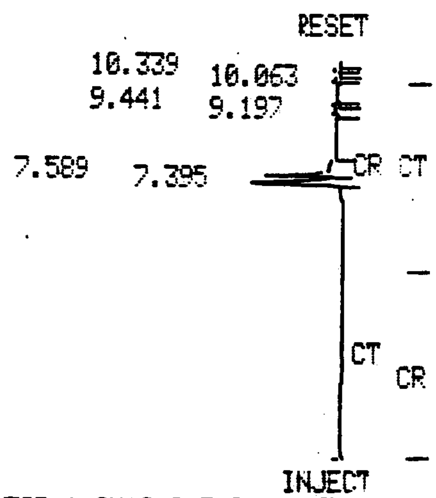
091060-B

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 59
TIME 14:35 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.395	62.9587	66353
2		7.589	37.0412	39038
TOTALS:			100.0000	105392

DETECTED PEAKS: 6 REJECTED PEAKS: 4
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -26

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



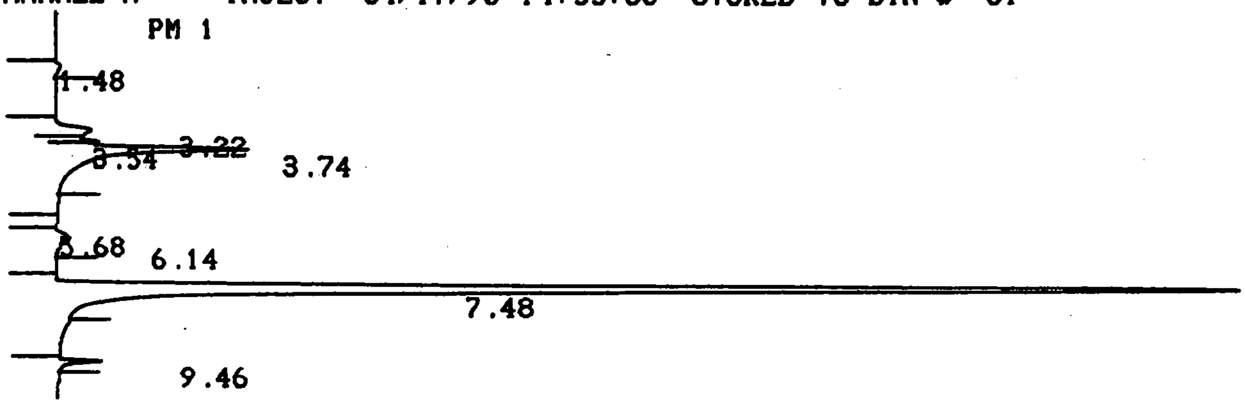
FID A 8X10 0.5 CM/M 15%

NOISE = 40.5
14:35 FAULT 59 DET B FLAMEOUT
14:35 FAULT 47 DET A FLAMEOUT

W090362

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX   NAME   SAM AMT   SCALE
SI= W090362 MP 50 ML X10 1025
END OF DIALOG
SA=.05 ✓
XF=10 ✓
AT   [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (2048) = 1024

CHANNEL A   INJECT 04/17/90 14:55:36 STORED TO BIN # 61



DATA SAVED TO BIN # 61

GOODYEAR   04/17/90 14:55:36   CH= "A" PS= 1.

FILE 1.   METHOD 5.   RUN 63   INDEX 1   BIN 61

ANALYST: SCOTT

SAMPLE 1   BIN 61 NAME ARUN0061

NAME		UG/L	RT	AREA	BC	RF
1		0.	1.48	89078	01	
2		0.	3.22	901741	02	
3		0.	3.54	517522	02	
DCE	78.8	~~0.494~~	3.74	4419470	03	8938514.
5		0.	5.68	15170	02	
CHLF	6.93	~~0.035~~	6.14	335292	03	9820784.
TCE	442	~~2.211~~	7.48	22063296	01	9976949.
PCE	10.0	0.05	9.46	356531	01	7137224.
TOTALS		2.79		28698100		

WARNING - MEMORY AT 7. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

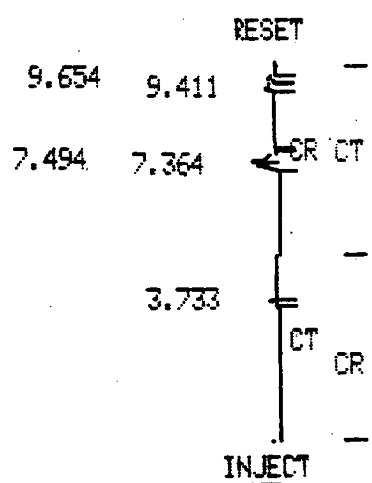
W090362

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 60
TIME 14:50 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		7.364	40.7394	11716
2	TCE	7.494	48.2648	13880
3	PCE	9.411	10.9956	3162
TOTALS:			100.0000	28758

DETECTED PEAKS: 5 REJECTED PEAKS: 2
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -26

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



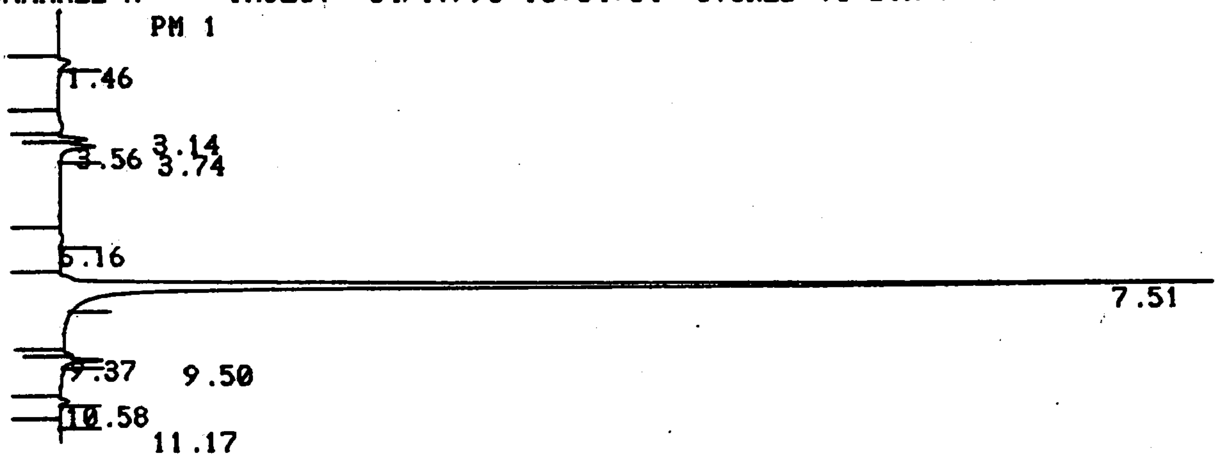
FID A 8X10 0.5 CM/M 15%

14:50 FAULT 59 DET B FLAMEOUT
14:50 FAULT 47 DET A FLAMEOUT

SVEA 117

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SVEA17 MP 50 ML X10
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (2048) = 512

CHANNEL A INJECT 04/17/90 15:34:54 STORED TO BIN # 63



DATA SAVED TO BIN # 63

GOODYEAR 04/17/90 15:34:54 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 65 INDEX 1 BIN 63

ANALYST: SCOTT

SAMPLE 1 BIN 63 NAME ARUN0063

NAME		UG/L	RT	AREA	BC	RF
1		0.	1.46	89349	01	
2		0.	3.14	63475	02	
3		0.	3.56	150556	02	
DCE	5.55	~~0.028~~	3.74	247922	03	8938514.
CHLF	.87	~~0.004~~	6.16	42902	01	9820784.
TCE	169	~~0.701~~	7.51	6988694	01	9976949.
7		0.	9.37	53237	02	
PCE	485	~~0.024~~	9.5	172938	03	7137224.
9		0.	10.58	45105	01	
10		0.	11.17	9334	01	
TOTALS		0.757		7863512		

WARNING - MEMORY AT 2. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

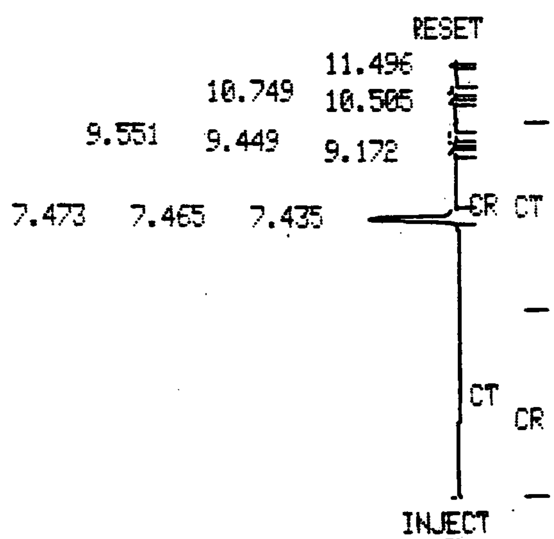
SVEA 117

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 62
TIME 15:30 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1		7.435	58.3226	43314
2		7.465	9.1101	6765
3	TCE	7.473	30.9582	22991
4	PCE	9.449	1.6089	1194
TOTALS:			100.0000	74267

DETECTED PEAKS: 9 REJECTED PEAKS: 5
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 33.8 OFFSET: -27

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



FID A 8X10 0.5 CM/M 15%

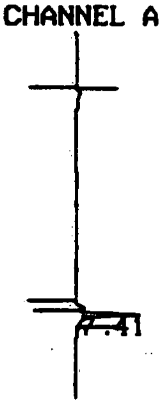
15:29 FAULT 59 DET B FLAMEOUT
15:29 FAULT 47 DET A FLAMEOUT
15:22 FAULT 59 DET B FLAMEOUT
15:22 FAULT 47 DET A FLAMEOUT

WARNING - MEMORY AT 4. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

System Blank

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SYSTEM BLANK
END OF DIALOG
SA=.05
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (2048) = 512

CHANNEL A INJECT 04/17/90 12:51:51 STORED TO BIN # 54



DATA SAVED TO BIN # 54

GOODYEAR 04/17/90 12:51:51 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 56 INDEX 1 BIN 54

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
1	0.	7.41	55692 02	
TCE	6.158	7.58	307210 03	9976949.
TOTALS	6.158		362902	

WARNING - MEMORY AT 1. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

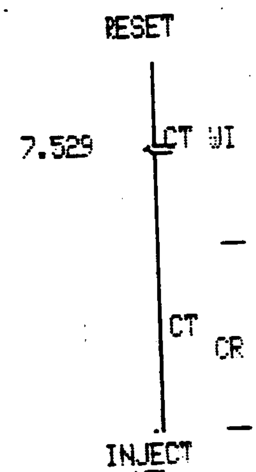
System ck

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 53
TIME 12:46 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	TCE	7.529	100.0000	1709
	TOTALS:		100.0000	1709

DETECTED PEAKS: 1 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 40.5 OFFSET: -26

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



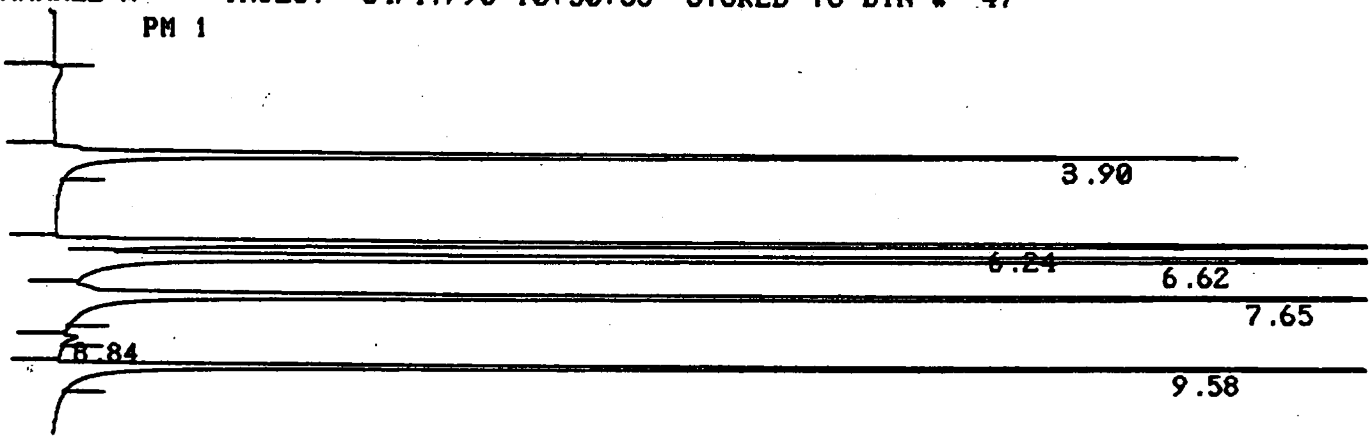
FID A 8X10 0.5 CM/M 15%

NOISE = 40.5
12:46 FAULT 59 DET B FLAMEOUT
12:46 FAULT 47 DET A FLAMEOUT
12:40 FAULT 59 DET B FLAMEOUT
NOISE = 20.2

Calib Chk

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (****) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION CHECK
END OF DIALOG
SA=1
XF=1
AT [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (512.) =

CHANNEL A INJECT 04/17/90 10:50:33 STORED TO BIN # 47



DATA SAVED TO BIN # 47

GOODYEAR 04/17/90 10:50:33 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 49 INDEX 1 BIN 47

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF	% Recovery
DCE	0.761	3.9	6805200	01	8938514.	95
CHLF	0.903	6.24	8862000	02	9820784.	71
~~MIX~~ CCl_4	1.73	6.62	14430332	08	8338320.	93
TCE	0.93	7.65	9278607	05	9976949.	83
5	0.	8.84	79565	01		
PCE	1.151	9.58	8210269	01	7137224.	89
TOTALS	5.475		47665973			

WARNING - MEMORY AT 3. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

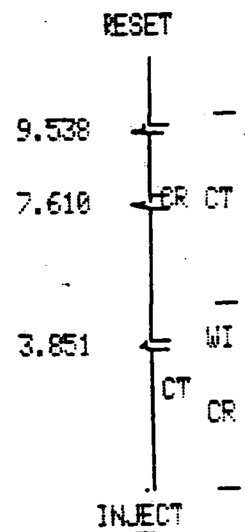
Calib Chk

VARIAN 3400 GAS CHROMATOGRAPH
METHOD 2 RUN 46
TIME 10:45 17 APR 90
SAMPLE:
RUN MODE: ANALYSIS
CALCULATION TYPE: EXTERNAL STANDARD

PEAK NO.	PEAK NAME	TIME MIN	RESULT A	AREA COUNTS
1	DCE	3.851	16.3753	2732
2	TCE	7.610	46.6370	7781
3	PCE	9.538	36.9876	6171
	TOTALS:		100.0000	16684

DETECTED PEAKS: 3 REJECTED PEAKS: 0
AMOUNT STANDARD: 1.0000000
MULTIPLIER: 1.0000000 DIVISOR: 1.0000000
NOISE: 47.3 OFFSET: -17

ERROR LOG:
ANNOTATION OMITTED
FACTORS ZERO
DEFAULT TO AREA PERCENT



FID A 8X10 0.5 CM/M 15%

NOISE = 47.3
10:45 FAULT 59 DET B FLAMEOUT
10:45 FAULT 47 DET A FLAMEOUT
10:37 FAULT 59 DET B FLAMEOUT
10:37 FAULT 47 DET A FLAMEOUT

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ________ Sample # FB# 2 Data Base File ________

Location Description Next to Mobile Lab.

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ___ Atm ✓

Weather Pt. Cloudy Barometric Pressure ________

Wind Direction & Speed 2 MPH. Air Temp (°F) 80

Surface Conditions Asphalt. Soil Temp(°F) ________

Time & Date 4-17-90 14:35 Cartridge # A-NHK.

Probe Depth 0 Probe # ____ Probe Volume ________

Adapter # ____ Cylinder # ____ Vacuum Gauge Reading 2 mmHg

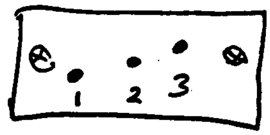
Sample Size 200 ml Pump Flow Rate 200 ml/min

Purge ________ Notes ________

Lab Receipt Signature [signature] Time/Date 1430 04/17/90

Compound	Concentration (uG/L) First	Second	Comment
DCE11	<.01		
CHLF	<.01		
~~TCA111~~ CCl4	<.01		
TCE	<.01		
PCE	<.01		
TCA111	<.01		

ilf



2

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #______ Sample # [redacted] SVE-4-3-8 Data Base File______

Location Description See location Map

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather cloudy Barometric Pressure______

Wind Direction & Speed 4 MPH. Air Temp (°F) 82

Surface Conditions Concrete Soil Temp(°F)______

Time & Date 4-16-90 11:00 Cartridge # A=14 B=31.

Probe Depth 8' Probe #______ Probe Volume______

Adapter #______ Cylinder #______ Vacuum Gauge Reading 2 / 6 mmHg

Sample Size 50 / 800 ml Pump Flow Rate 100 / 200 / ml/min

Purge 5 MIN @ 20"Hg. Notes______

Lab Receipt Signature [signature] Time/Date 1130 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~ ~~11 DCE~~			
~~TCE~~			
~~PCE~~			
~~Methane~~ ~~111TCA~~			
DCE11	4.97		
CHLF	<.01		
TCA111	<.01		
CCl4	<.01		
TCE	216		
PCE	13.3		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #________ Sample # PG-90-4-40' Data Base File________

Location Description — See Location Map.

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Cloudy Barometric Pressure________

Wind Direction & Speed 4 MPH Air Temp (°F) 82°

Surface Conditions Concrete Soil Temp(°F)________

Time & Date 4-16-90 12:20 Cartridge # A-03

Probe Depth 40' Probe #____ Probe Volume________

Adapter #____ Cylinder #____ Vacuum Gauge Reading <2"Hg mmHg

Sample Size 50 / [illegible] Pump Flow Rate 100/200 ml/min

Purge 20 MIN @ 10"Hg. Notes________

Lab Receipt Signature [signature] Time/Date 1330 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	87.6		
CHLF	2.76		
~~TCA111 +~~ CCl4	~~2.10~~ 2.14		
TCE	653		
PCE	103		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ______ Sample # SVE-A-3-28' Data Base File ______

Location Description See location Map

Sampler's Signature [illegible] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Cloudy Barometric Pressure ______

Wind Direction & Speed 4 MPH Air Temp (°F) 82

Surface Conditions Concrete Soil Temp (°F) ______

Time & Date 4-16-90 12:40 Cartridge # A-50 ~~#4~~

Probe Depth 28' Probe # ______ Probe Volume ______

Adapter # ______ Cylinder # ______ Vacuum Gauge Reading 15 mmHg

Sample Size 50 / ~~100~~ Pump Flow Rate 100/ ~~200~~ ml/min

Purge 5 Min @ ~~26~~" Hg Notes ______

Lab Receipt Signature Scott Wightman Time/Date 1330 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	<.06		
CHLF	<.01		
~~TCA111~~ + CCl4	<.02		
TCE	17.6		
PCE	0.23		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ________ Sample # SVE-A-337' Data Base File ________

Location Description See location Map

Sampler's Signature ________ Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Cloudy Barometric Pressure ________

Wind Direction & Speed 4 MPH Air Temp (°F) 80

Surface Conditions Concrete Soil Temp(°F) ________

Time & Date 4-16-90 12:55 Cartridge # A-252

Probe Depth 37 Probe # ______ Probe Volume ________

Adapter # ______ Cylinder # ______ Vacuum Gauge Reading 2 mmHg

Sample Size 50 / ~~200~~ Pump Flow Rate 100 / ~~200~~ ml/min

Purge 5 Min @ 8" Hg. Notes ________

Lab Receipt Signature [signature] Time/Date 1330 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	73.5		
CHLF	1.82		
~~TCA111 +~~ CCl4	~~0.68~~ 0.69		
TCE	306		
PCE	26.1		
TCA111	6.63		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ______ Sample # HG-90-5-20' Data Base File ______

Location Description See location Map

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Sunny Barometric Pressure ______

Wind Direction & Speed 6 MPH Air Temp (°F) 83

Surface Conditions Concrete Soil Temp(°F) ______

Time & Date 4-16-90 4:48 Cartridge # A-05

Probe Depth 20' Probe # ______ Probe Volume ______

Adapter # ______ Cylinder # ______ Vacuum Gauge Reading 3 mmHg

Sample Size 50 Pump Flow Rate 100 ml/min

Purge 20 MIN @ 9" Hg. Notes ______

Lab Receipt Signature [signature] Time/Date 1645 04/16/90

Compound	Concentration (uG/L) First	Concentration (uG/L) Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	1910		
CHLF	<.01		
~~TCA11 +~~ CCl4	~~1060~~ 1740		
TCE	63.0		
PCE	1.00		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ____ Sample # PG-90-8-45' Data Base File ____

Location Description See location map

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Sunny Barometric Pressure ____

Wind Direction & Speed 8 mph Air Temp (°F) 80

Surface Conditions Concrete Soil Temp(°F) ____

Time & Date 4-16-90 10:35 Cartridge # A-04

Probe Depth 45' Probe # ____ Probe Volume ____

Adapter # ____ Cylinder # ____ Vacuum Gauge Reading 2.5 mmHg

Sample Size 50 ul Pump Flow Rate 100 ml/min

Purge 20 l/min 11.5"Hg. Notes ____

Lab Receipt Signature [signature] Time/Date 1435 04/16/90

Compound	Concentration (uG/L) First	Concentration (uG/L) Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	552		
CHLF	17.9		
~~TCA111+~~ CCL4	<.01		
TCE	389		
PCE	1.55		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #______ Sample # SVE-A2-18' Data Base File______

Location Description See location Map

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Sunny Barometric Pressure______

Wind Direction & Speed 4 MPH Air Temp (°F) 82

Surface Conditions Concrete Soil Temp(°F)______

Time & Date 4-16-90 - 14:30 Cartridge # A-05

Probe Depth 18' Probe # / Probe Volume______

Adapter # / Cylinder # / Vacuum Gauge Reading 24 mmHg

Sample Size 50 Pump Flow Rate 100 ml/min

Purge 5 Min @ 26" Hg. Notes______

Lab Receipt Signature Scott S. Wightman Time/Date 1509 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	14.1		
CHLF	~~9.45~~ <.01		
~~TCA111~~ + CCl4	<.01		
TCE	7.42		
PCE	<.01		
TCA111	63.7		

.37

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ________ Sample # SVEA-2-8' Data Base File ________

Location Description See location Map.

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Sunny Barometric Pressure ________

Wind Direction & Speed 4 MPH. Air Temp (°F) 82

Surface Conditions Concrete Soil Temp(°F) ________

Time & Date 4-16-90 - 14:20 Cartridge # A= UNK.

Probe Depth 8' Probe # ____ Probe Volume ________

Adapter # ____ Cylinder # ____ Vacuum Gauge Reading 3 mmHg

Sample Size 50 ml Pump Flow Rate 100 ml/min

Purge 5 Min @ 7"Hg. Notes ________

Lab Receipt Signature [signature] Time/Date 1509 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	5.55		
CHLF	0.95		
~~TCA111~~ CCl4	~~6.17~~ <.01		
TCE	103		
PCE	1.18		
TCA111	32.9		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ____ Sample # PG-90-B-20 Data Base File ____

Location Description See location Map

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Sun Barometric Pressure ____

Wind Direction & Speed Calm Air Temp (°F) 79

Surface Conditions Concrete Soil Temp(°F) ____

Time & Date 4-16-90 17:20 Cartridge # A=UNK.

Probe Depth 20 Probe # ____ Probe Volume ____

Adapter # - Cylinder # ____ Vacuum Gauge Reading 2 mmHg

Sample Size 50 ml. Pump Flow Rate 100 ml/min

Purge 20 Min Purge @ 12"Hg. Notes ____

Lab Receipt Signature [signature] Time/Date 1911 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	464		
CHLF	10.2		
~~TCA111~~ CCl4	~~4~~ <.01		
TCE	445		
PCE	3.33		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ____ Sample # SVE-A-1-37' Data Base File ____

Location Description See location Map

Sampler's Signature [illegible] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Cloudy Barometric Pressure ____

Wind Direction & Speed ____ Air Temp (°F) 74

Surface Conditions Concrete Soil Temp(°F) ____

Time & Date 4-16-90 19:23 Cartridge # A = 09 B = 31

Probe Depth 37' Probe # ____ Probe Volume ____

Adapter # ____ Cylinder # ____ Vacuum Gauge Reading 3 / 6 mmHg

Sample Size 2 / 50 ml. Pump Flow Rate 100 ml/min

Purge 5 Min @ 6" Hg. Notes ____

Lab Receipt Signature Scott J Wightman Time/Date 2015 04/16/90

[illegible] collected one 8 ounce [illegible]

Compound	Concentration (uG/L) First	Second	Comment
DCE11	33.9	58.4	
CHLF	3.71	4.37	
~~TCA111 +~~ CCl4	<.01 ~~0.16~~	<.01	
TCE	1230	1080	
PCE	27.3	22.8	
TCA111	.86	<.01	

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #______ Sample # SVE-A-1-17' Data Base File______

Location Description See location Map.

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Pt. Cloudy Barometric Pressure______

Wind Direction & Speed 20 MPH Air Temp (°F)______

Surface Conditions Concrete Soil Temp(°F)______

Time & Date 4-16-90 - 19:48 Cartridge # A-14

Probe Depth 17' Probe #______ Probe Volume______

Adapter #______ Cylinder #______ Vacuum Gauge Reading 2 mmHg

Sample Size 50 ml Pump Flow Rate 100 ml/min

Purge 5 MIN @ 13"Hg. Notes______

Lab Receipt Signature [signature] Time/Date 2015 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
DCE11	0.24		
CHLF	<.01		
~~TCA111~~ CCl4	<.01		
TCE	5.93		
PCE	<.01		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #____ Sample # SVEA-1-27' Data Base File____

Location Description See location Map.

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Cloudy Barometric Pressure____

Wind Direction & Speed 20 MPH Air Temp (°F) 74

Surface Conditions Concrete Soil Temp(°F)____

Time & Date 4-16-90 · 19:37 Cartridge # A-02

Probe Depth 27' Probe #____ Probe Volume____

Adapter # - Cylinder #____ Vacuum Gauge Reading 124 mmHg

Sample Size____ Pump Flow Rate 100 ml/min

Purge 5 MIN @ 25"Hg Notes____

Lab Receipt Signature [signature] Time/Date 2015 04/16/90

Compound	Concentration (uG/L) First	Concentration (uG/L) Second	Comment
DCE11	0.19		
CHLF	<.01		
~~TCA111~~ + CCl4	<.01		
TCE	4.53		
PCE	<.01		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ______ Sample # PG-90-3-45' Data Base File ______

Location Description See location Map

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Pt. cloudy Barometric Pressure ______

Wind Direction & Speed 10 NE @ 4 Air Temp (°F) 78

Surface Conditions Concrete Soil Temp(°F) ______

Time & Date 4-16-90 18:01 Cartridge # A = 44

Probe Depth 45' Probe # ______ Probe Volume ______

Adapter # - Cylinder # ______ Vacuum Gauge Reading 2 mmHg

Sample Size 50 Pump Flow Rate 100 ml/min

Purge 20 MIN @ 12" dep Notes ______

Lab Receipt Signature Scott J. Wightman Time/Date 1911 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	29.2		
CHLF	~~2.29~~ <.01		
~~TCA111~~ CCl4	<.01		
TCE	125		
PCE	0.98		
TCA111	25.1		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ______ Sample # PG-90-3-20' Data Base File ______

Location Description See location Map

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Pt. Cloudy Barometric Pressure ______

Wind Direction & Speed 0-5 mph Air Temp (°F) 79

Surface Conditions Concrete Soil Temp(°F) ______

Time & Date 4-16-90 8:25 Cartridge # A=49

Probe Depth 20' Probe # ______ Probe Volume ______

Adapter # – Cylinder # ______ Vacuum Gauge Reading 2 mmHg

Sample Size 50 Pump Flow Rate 100 ml/min

Purge 30 Min @ 13"Hg. Notes ______

Lab Receipt Signature Scott S. Hightower Time/Date 1911 04/16/90

Compound	Concentration (uG/L) First	Second	Comment
~~Carbon tetrachloride~~			
~~Chloroform~~			
~~DCM~~			
~~TCE~~			
~~PCE~~			
~~Methane~~			
DCE11	14.4		
CHLF	~~18.9~~ <.01		
~~TCA111~~ CCl4	<.01		
TCE	55.0		
PCE	0.67		
TCA111	208		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #______ Sample # RG-90-5-45' Data Base File______

Location Description See location Map.

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Pt. Cloudy Barometric Pressure______

Wind Direction & Speed 2mph Air Temp (°F) 80

Surface Conditions Concrete Soil Temp(°F)______

Time & Date 4-17-90 11.53 Cartridge # A=blk.

Probe Depth 45' Probe #______ Probe Volume______

Adapter # ‾ Cylinder #______ Vacuum Gauge Reading <2 mmHg

Sample Size 25 ul Pump Flow Rate 50 ml/min

Purge 20 Min @ 11" Hg. Notes______

Lab Receipt Signature______ Time/Date______

Compound	Concentration (uG/L) First	Concentration (uG/L) Second	Comment
DCE11	2400		
CHLF	3.1		
~~TCA111 +~~ CCl4	~~2200~~ <.01		
TCE	453		
PCE	14.1		
TCA111	~~20700~~ 2068		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #__________ Sample # PG-904-20' Data Base File__________

Location Description → See location Map

Sampler's Signature [signature] Soil___Water___Soil Gas ✓ Atm___

Weather Pt. Cloudy Barometric Pressure__________

Wind Direction & Speed 2MPH Air Temp (°F) 79

Surface Conditions Concrete Soil Temp(°F)__________

Time & Date 4-17-90 13:55 Cartridge # A-14 B-44

Probe Depth 20' Probe #_____ Probe Volume__________

Adapter #_____ Cylinder #_____ Vacuum Gauge Reading <2 mmHg

Sample Size 25 ml Pump Flow Rate 50 ml/min

Purge 20 Min @ 12" Hg. Notes__________

Lab Receipt Signature [signature] Time/Date 1427 04/17/90

Compound	Concentration (uG/L) First	Second	Comment
DCE11	67.6	99.0	
CHLF	0.70	1.00	
~~TCA11~~ CCl4	38.2 ~~37.4~~	~~62.6~~ 64.0	
TCE	3350	3460	
PCE	268	301	
TCA111	<.01	<.01	

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ______ Sample # SVE-A-3-18' Data Base File ______

Location Description See location Map.

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Sunny Barometric Pressure ______

Wind Direction & Speed 2 MPH Air Temp (°F) 82°

Surface Conditions Concrete Soil Temp(°F) ______

Time & Date 4-17-90 11:24 Cartridge # A-09

Probe Depth 18' Probe # ______ Probe Volume ______

Adapter # ‒ Cylinder # ______ Vacuum Gauge Reading 2 mmHg

Sample Size 50 Pump Flow Rate 100 ml/min

Purge 5 Min @ 11"Hg. Notes ______

Lab Receipt Signature ______ Time/Date ______

Compound	Concentration (uG/L) First	Second	Comment
DCE11	11.8		
CHLF	3.47		
~~TCA111~~ CCl4	<.01		
TCE	72.3		
PCE	0.55		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #______ Sample # ~~[illegible]~~ SVE-A-2-27' Data Base File______

Location Description See location Map

Sampler's Signature [illegible] Soil___ Water___ Soil Gas ✓ Atm___

Weather Sunny Barometric Pressure______

Wind Direction & Speed 2MPH Air Temp (°F) 81

Surface Conditions Concrete Soil Temp(°F)______

Time & Date 4-17-90 11:04 Cartridge # A=[illegible]

Probe Depth 27' Probe #____ Probe Volume______

Adapter #____ Cylinder #____ Vacuum Gauge Reading 23 mmHg

Sample Size 50 ml Pump Flow Rate 100 ml/min

Purge 5 Min @ 26" Hg Notes______

Lab Receipt Signature______ Time/Date______

Compound	Concentration (uG/L) First	Second	Comment
DCE11	0.37		
CHLF	2.44		
~~TCA111~~ + CCl4	<.01		
TCE	4.15		
PCE	<.01		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #________ Sample # SVEA-2-37' Data Base File________

Location Description See location Map

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Sunny Barometric Pressure________

Wind Direction & Speed 2 MPH Air Temp (°F)________

Surface Conditions Concrete Soil Temp(°F)________

Time & Date 4-17-90 11:11 Cartridge # A=UNK.

Probe Depth 37' Probe #_____ Probe Volume________

Adapter #_____ Cylinder #_____ Vacuum Gauge Reading 2 mmHg

Sample Size 50 ml Pump Flow Rate 100 ml/min

Purge 5 Min @ 6"Hg. Notes________

Lab Receipt Signature________ Time/Date________

Compound	Concentration (uG/L) First	Second	Comment
DCE11	48.8		
CHLF	4.11		
~~TCA111 +~~ CCl4	~~0.55~~ 0.56		
TCE	755		
PCE	27.4		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # ____ Sample # 0910-60' Data Base File ____

Location Description See location Map

Sampler's Signature [signature] Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Pt. Cloudy Barometric Pressure ____

Wind Direction & Speed 7MPH. Air Temp (°F) 80°

Surface Conditions Street Soil Temp(°F) ____

Time & Date 4-17-90 13:00 Cartridge # A=02 B=46

Probe Depth 60' Probe # ____ Probe Volume ____

Adapter # ____ Cylinder # ____ Vacuum Gauge Reading <2 mmHg

Sample Size 50 ml. Pump Flow Rate 100 ml/min

Purge 40 MIN @ 7"Hg. Notes ____

Lab Receipt Signature ____ Time/Date ____

Compound	Concentration (uG/L) First	Second	Comment
DCE11	<.01	<.01	
CHLF	15	16	
~~TCAHH +~~ CCl4	<.01	<.01	
TCE	516	518	
PCE	10.9	6.5	
TCA 111	<.01	<.01	

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #______ Sample #0903-62' Data Base File______

Location Description See Location Map

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Sunny Barometric Pressure______

Wind Direction & Speed 2 MPH Air Temp (°F) 79

Surface Conditions Concrete Soil Temp(°F)______

Time & Date 4-17-90 10:25 Cartridge # A=19 B=31

Probe Depth 62 Probe #______ Probe Volume______

Adapter #______ Cylinder #______ Vacuum Gauge Reading 3/2 mmHg

Sample Size 2/ 50 ml Pump Flow Rate 100 ml/min

Purge 40 MIN @ 8"Hg. Notes______

Lab Receipt Signature______ Time/Date______

Compound	Concentration (uG/L) First	Second	Comment
DCE 11	98.8		
CHLF	6.83		
~~TCA111~~ CCl4	<.01		
TCE	442		
PCE	10.0		
TCA111	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #______ Sample #SVE-A-1-7' Data Base File______

Location Description See location Map

Sampler's Signature [signature] Soil___ Water___ Soil Gas ✓ Atm___

Weather Pt. Cloudy Barometric Pressure______

Wind Direction & Speed 2 MPH. Air Temp (°F) 79

Surface Conditions Concrete Soil Temp(°F)______

Time & Date 4-17-90 14:08 Cartridge # A=12 B=35

Probe Depth 7' Probe #______ Probe Volume______

Adapter #______ Cylinder #______ Vacuum Gauge Reading 2/2 mmHg

Sample Size 50 ml. Pump Flow Rate 100 ml/min

Purge 5 MIN @ 8"Hg. Notes______

Lab Receipt Signature Scott Wightman Time/Date 1427 04/17/90

Compound	Concentration (uG/L) First	Second	Comment
DCE11	5.55		
CHLF	0.87		
~~TCA111~~ + CCl4	<.01		
TCE	168		
PCE	1.85		
TCA111	<.01		

LORAL Facility

Army Corp of Engineers July 11, 1990

1. Standards were prepared by weighing equivalent volumes of the indicated analytes to make an approximately equivalent mass mixture

Compound	Mass, ug	ρ	% w/w	Calibration Mass, ug
DCE-1,1	0.39	1.170	.07	0.28
Chloroform	0.94	1.483	.18	0.72
TCA-1,1,1	0.60	1.338	.12	0.48
Carbon Tet	0.92	1.594	.18	0.72
TCE	1.01	1.460	.19	0.76
PCE	1.35	1.623	.26	1.04

$\rho_{\bar{x}} = 1.498\ g\ ml^{-1}$ $\quad \frac{1498\ ug}{ul}(X) = \frac{6\ ug}{ml}(1000\ ml)$ $\quad X = 4.005 \sim 4.00\ \mu l$

2. Chromatographic Conditions

Gas Flows

Carrier	6	$ml\ min^{-1}$
Makeup	25	"
Reaction	30	"

Tank Pressures

He	1450	psi
H_2	1360	
N_2	500	

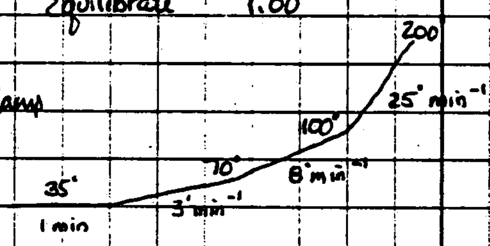
Heated Zones

Purge	180°c
Desorb	380
Valve Oven	230
xfer line	230
Injector	230
Detectors	230
Aux Oven	250

Timed Functions

Purge	2.00 min
Desorb	10.00
Equilibrate	1.00

Ramp



Acquisition Parameters

ELCD Range 100 Atten 128

Operator

Scott J. Wightman

```
FI= 2.     FE= 2.     MN= 0.
PRESS 'ENTER' TO SKIP ENTRY
ENABLE BASELINE DRAWING? [Y/N] (N)
STORAGE MENU? [Y,N] (N)

FUNCTION NUMBER [0-10] (0)

FILE NAME () =" SCOTT2
TIME        FUNCTION  VALUE
TT= .1      TF=" PM   TV= 1
TT= .1      TF=" AZ   TV= 1
TT= 20      TF=" ER   TV= 1
TT=

METHOD NUMBER [0,1,2,5] (0) MN= 5
IF NV=0 THEN NO CALIB
IF NV=1 THEN NORMAL CALIB
IF NV>1 THEN MULTI-LEVEL CALIB
NUMBER OF LEVELS [0-26] ( 0. ) NV=
COMPONENT TABLE...
RET TIME        RESP FACT       NAME
RT= 2.32        RF= 1533386     CN=" DCE1
RT= 4.50        RF= 1668501     CN=" CHLF
RT= 4.75        RF= 1637149     CN=" TCA1
RT= 5.00        RF= 2036311     CN=" CCL4
RT= 6.45        RF= 1669151     CN=" TCE
RT= 10.7        RF= 1620344     CN=" PCE
RT=
EXPECTED CONC [Y,N] (N)

RRT REF PEAK: RP(I)=
SAMPLE TABLE...
ANALYST () AN=" SCOTT
INJECTIONS/SAMPLE [0-254] ( 0. ) RA= 1
SAMPLES BETWEEN CALIB [0-254] ( 0. ) CI= 100
CONC UNITS () CU=" UG/L
SAM IX   NAME          SAM AMT     SCALE
SI=
END OF DIALOG
PW=6
PT=1000
CS=0.5
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 128.) =
XF=1
SA=1
```

DCE 1,1	0.28	403 469	437 235	447 340	429 348	1 533 386
Chloroform	0.72	1 104 807	1 223 731	1 275 424	1 201 321	1 668 501
TCA 1,1,1	0.48	733 073	800 831	823 591	785 832	1 637 147
CCl_4	0.72	1 376 533	1 497 555	1 524 343	1 466 144	2 036 311
TCE	0.76	1 174 393	1 306 416	1 324 856	1 268 555	1 669 151
PCE	1.04	1 639 898	1 707 075	1 708 500	1 685 158	1 620 344

RT(1) = 2.32 RF CN(1) = DCE1

RT(2) = 4.50 CN(2) = Chloro

RT(3) = 4.75 CN(3) = TCA1

RT(4) = 5.00 CN(4) = CCl4

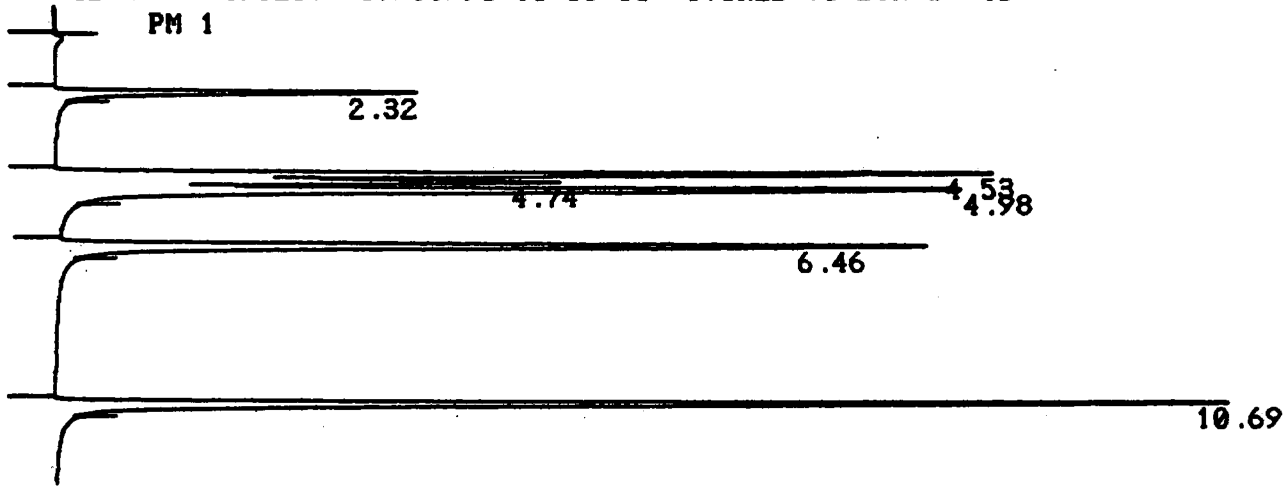
RT(5) = 6.45 CN(5) = TCE

RT(6) = 10.70 CN(6) = PCE

Calib

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (100) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION
END OF DIALOG

CHANNEL A INJECT 07/11/90 10:53:03 STORED TO BIN # 43



DATA SAVED TO BIN # 43

SCOTT 07/11/90 10:53:03 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 43 INDEX 1 BIN 43

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	2.32	447340	01	
2	0.	4.53	1275424	02	
3	0.	4.74	823591	02	
DCE1	2.208	4.98	1524343	03	690268.
5	0.	6.46	1324856	01	
TCA1	1.86	10.69	1708500	01	918594.
TOTALS	4.068		7104054		

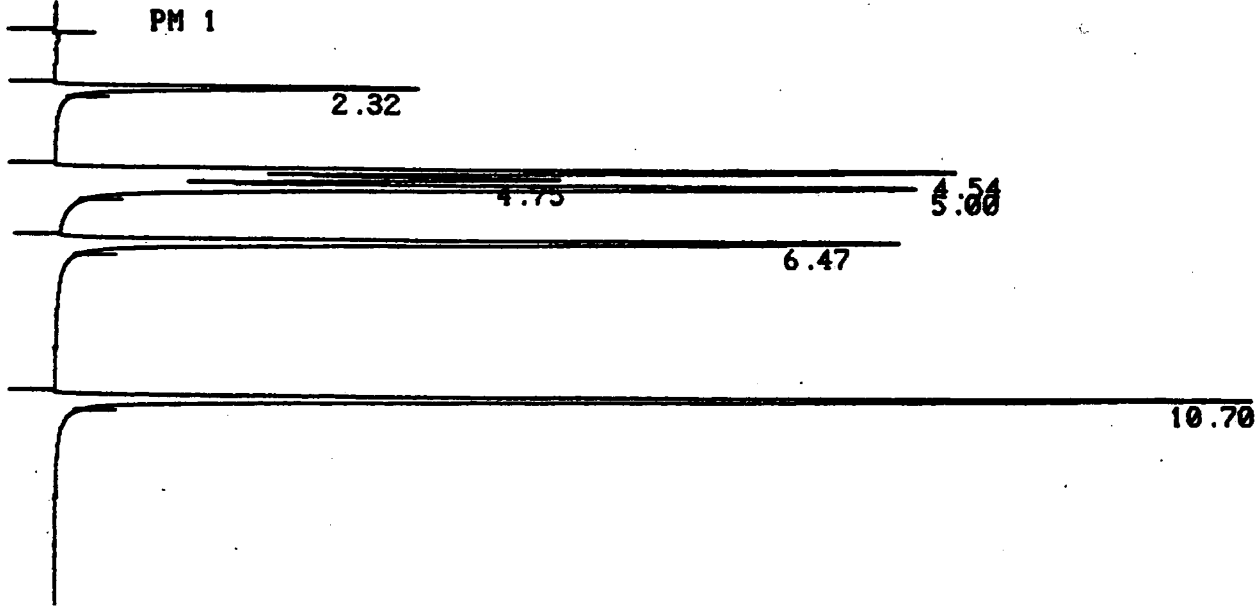
WARNING - MEMORY AT 5. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

Calib

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (100) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION
END OF DIALOG

CHANNEL A INJECT 07/11/90 10:31:45 STORED TO BIN # 42



DATA SAVED TO BIN # 42

SCOTT 07/11/90 10:31:45 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 42 INDEX 1 BIN 42

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	2.32	437235	01	
2	0.	4.54	1223731	02	
3	0.	4.75	800831	02	
DCE1	2.17	5.	1497555	03	690268.
5	0.	6.47	1306416	01	
TCA1	1.858	10.7	1707075	01	918594.
TOTALS	4.028		6972843		

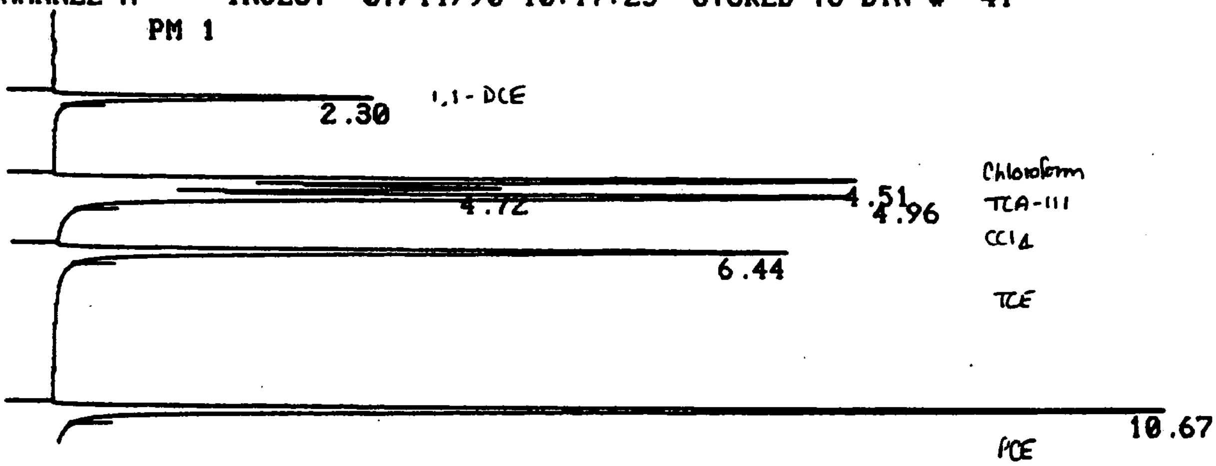
WARNING - MEMORY AT 3. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

Calib

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (100) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= CALIBRATION
END OF DIALOG

CHANNEL A INJECT 07/11/90 10:17:25 STORED TO BIN # 41



DATA SAVED TO BIN # 41

SCOTT 07/11/90 10:17:25 CH= "A" PS= 1.

FILE 1. METHOD 5. RUN 41 INDEX 1 BIN 41

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	2.3	403469	01	
2	0.	4.51	1104807	02	
3	0.	4.72	733073	02	
DCE1	1.994	4.96	1376533	03	690268.
5	0.	6.44	1174393	01	
TCA1	1.785	10.67	1639898	01	918594.
TOTALS	3.779		6432173		

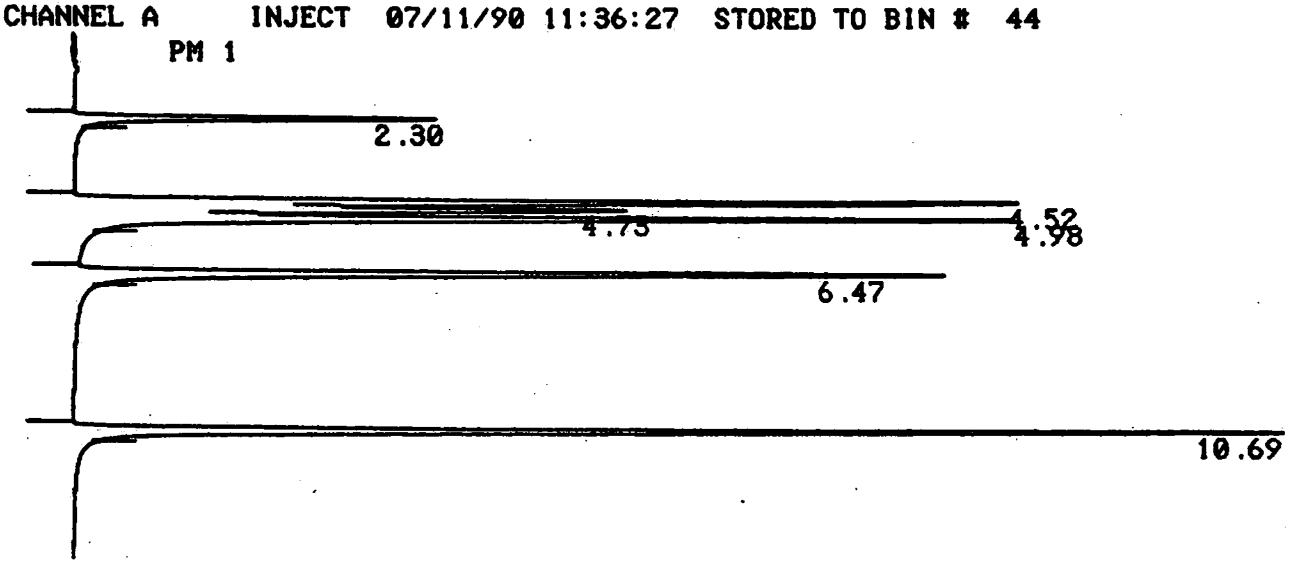
WARNING - MEMORY AT 2. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

Calib Check C-4

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (100) CI=
CONC UNITS (UG/L) CU="
SAM IX   NAME   SAM AMT   SCALE
SI= CALIB CHECK
END OF DIALOG
SA=1
AT   [0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096] (128.) =

CHANNEL A   INJECT 07/11/90 11:36:27 STORED TO BIN # 44



DATA SAVED TO BIN # 44

SCOTT2   07/11/90 11:36:27   CH= "A"   PS= 1.

FILE 2.   METHOD 5.   RUN 1   INDEX 1   BIN 44

ANALYST: SCOTT

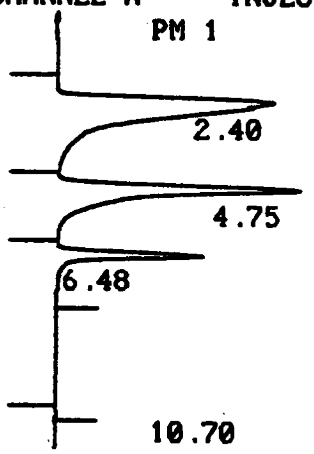
NAME	UG/L	RT	AREA	BC	RF	% Recov
DCE1	0.294	2.3	451336	01	1533386.	103
CHLF	0.787	4.52	1311876	02	1668501.	108
TCA1	0.535	4.73	877075	02	1637149.	110
CCL4	0.776	4.98	1578517	03	2036311.	107
TCE	0.784	6.47	1309918	01	1669151.	103
PCE	1.041	10.69	1686809	01	1620344.	100
TOTALS	4.217		7215531			

WARNING - MEMORY AT 6. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (100) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SAMPLE-PG-90-5-15
END OF DIALOG
SA=.050
XF=10
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (128.) = 2048

CHANNEL A INJECT 07/11/90 11:54:42 STORED TO BIN # 45



DATA SAVED TO BIN # 45

SCOTT2 07/11/90 11:54:42 CH= "A" PS= 1.

FILE 2. METHOD 5. RUN 2 INDEX 1 BIN 45

ANALYST: SCOTT

NAME	UG/L	RT	AREA BC	RF
DCE1	3277.23	2.4	25126295 02	1533386.
TCA1	1876.343	4.75	15359261 02	1637149.
TCE	666.372	6.48	5561382 03	1669151.
PCE	6.286	10.7	50926 01	1620344.
TOTALS	5826.231		46097864	

WARNING - MEMORY AT 2. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

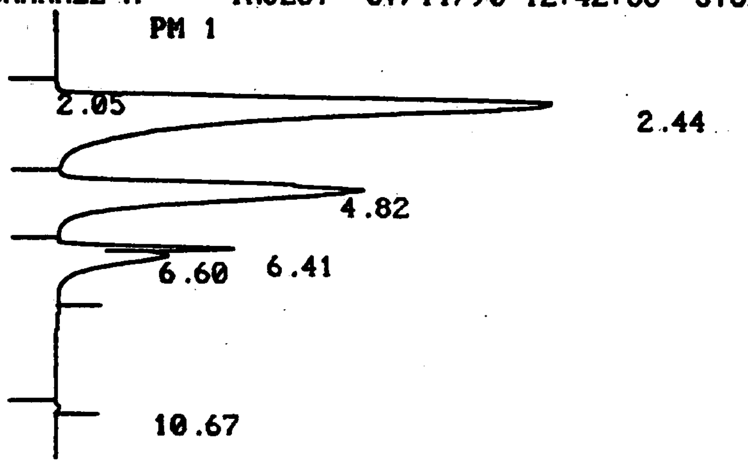
INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

20'

u/8

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (100) CI=
CONC UNITS (UG/L) CU="
SAM IX   NAME   SAM AMT   SCALE
SI= SAMPLE-PG-90-5-15
END OF DIALOG
SA=.05
XF=10
AT   [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (64.) = 1024

CHANNEL A   INJECT 07/11/90 12:42:36   STORED TO BIN # 48



DATA SAVED TO BIN # 48

SCOTT2   07/11/90 12:42:36   CH= "A" PS= 1.

FILE 2.   METHOD 5.   RUN 5   INDEX 1   BIN 48

ANALYST: SCOTT

NAME		UG/L	RT	AREA	BC	RF
1		0.	2.05	14806	02	
DCE1		3911.06	2.44	29985826	02	1533386.
TCA1		1897.766	4.82	15534629	02	1637149.
TCE	740	~~291.997~~	6.41	2436932	02	1669151.
5		0.	6.6	3738577	03	
PCE		6.579	10.67	53304	01	1620344.

TOTALS	6107.402		51764074

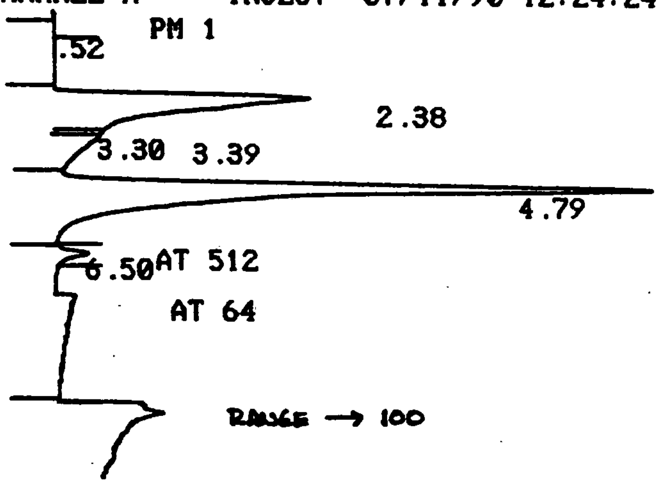
WARNING - MEMORY AT 3. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

40

```
SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] ( 1. ) RA=
SAMPLES BETWEEN CALIB [0-254] ( 100) CI=
CONC UNITS (UG/L ) CU="
SAM IX   NAME            SAM AMT     SCALE
SI= SAMPLE-PG-90-5-20
END OF DIALOG
SA=.05
XF=10
AT    [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] ( 128.) = 1024
```

CHANNEL A   INJECT 07/11/90 12:24:24 STORED TO BIN # 47



DATA SAVED TO BIN # 47

SCOTT2   07/11/90 12:24:24   CH= "A"   PS= 1.

FILE 2.   METHOD 5.   RUN   4   INDEX   1   BIN 47

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
1	0.	0.52	12325	01	
DCE1	1588.475	2.38	12178728	02	1533386.
3	0.	3.3	408127	02	
4	0.	3.39	2135350	02	
TCA1	2506.294	4.79	20515885	03	1637149.
TCE	31.063	6.5	259245	01	1669151.
TOTALS	4125.832		35509660		

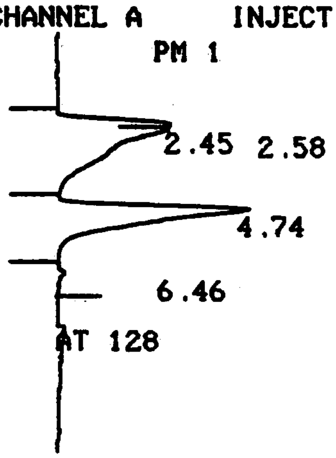
WARNING - MEMORY AT 4. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

40'

SAMPLE TABLE...
ANALYST (SCOTT) AN="
INJECTIONS/SAMPLE [0-254] (1.) RA=
SAMPLES BETWEEN CALIB [0-254] (100) CI=
CONC UNITS (UG/L) CU="
SAM IX NAME SAM AMT SCALE
SI= SAMPLE-PG-90-5-20
END OF DIALOG
SA=.05
AT [0.5,1,2,4,8,16,32,64,128,256,512,1024,2048,4096] (2048) =
XF=10

CHANNEL A INJECT 07/11/90 12:09:36 STORED TO BIN # 46



DATA SAVED TO BIN # 46

SCOTT2 07/11/90 12:09:36 CH= "A" PS= 1.

FILE 2. METHOD 5. RUN 3 INDEX 1 BIN 46

ANALYST: SCOTT

NAME	UG/L	RT	AREA	BC	RF
DCE1	2279 ~~620.606~~	2.45	4758139	02	1533386.
2	0.	2.58	12718011	02	
TCA1	2046.245	4.74	16750042	02	1637149.
TCE	35.41	6.46	295521	03	1669151.
TOTALS	2702.261		34521713		

WARNING - MEMORY AT 0. K - UNPROTECTED CHROMATOGRAMS WILL BE REPLACED

INK LOW - CHANGE PRINT CARTRIDGE AND PRESS [CTRL-SHIFT-C]

c/o

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location #________ Sample # SG-TRIP Data Base File________

Location Description Phoenix - Goodyear Airport (LORAL FACILITY)

Sampler's Signature SW Soil___ Water___ Soil Gas ✓ Atm___

Weather________ Barometric Pressure________

Wind Direction & Speed________ Air Temp (°F)________

Surface Conditions________ Soil Temp(°F)________

Time & Date________ Cartridge #________

Probe Depth________ Probe #________ Probe Volume________

Adapter #________ Cylinder #________ Vacuum Gauge Reading________mmHg

Sample Size________ Pump Flow Rate________ml/min

Purge________ Notes________

Lab Receipt Signature Scott J. Wightman Time/Date 1900 7/10/90

Compound	Concentration (uG/L) First	Concentration (uG/L) Second	Comment
DCE 11	<.01		
Chloroform	<.01		
TCA 111	<.01		
Carbon Tet	<.01		
TCE	<.01		
PCE	<.01		

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # PG-90-5/20 Sample # ____ Data Base File ____

Location Description LORAL Facility

Sampler's Signature WT Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Clear, Humid Barometric Pressure ____

Wind Direction & Speed Still Air Temp (°F) 105°

Surface Conditions Concrete Slab Soil Temp(°F) ____

Time & Date 1520 7/9/90 Cartridge # A = 30 B = 68

Probe Depth 15' BLS Probe # ____ Probe Volume ____

Adapter # ____ Cylinder # ____ Vacuum Gauge Reading A = 3 B = 2 mmHg

Sample Size 50 ml Pump Flow Rate 100 @ .5 min ml/min

Purge ____ Notes ____

By-passed flow valve, connected directly to pump inlet during purge to utilize pump capabilities

Lab Receipt Signature Scott J. Wightman Time/Date 1900 7/10/90

Compound	Concentration (uG/L) First	Second	Comment
DCE 11	3280	3910	
Chloroform	<.01	<.01	
TCA 111	1880	1900	
Carbon Tet	<.01	<.01	
TCE	666	740	
PCE	6.29	6.58	

HYDRO GEO CHEM, INC. SAMPLE INFORMATION AND TRANSFER FORM
(Original to Mobile Lab; Copy Kept in Field Book)

Location # PG-90-5/40 Sample # ____ Data Base File ____

Location Description LORAL Facility

Sampler's Signature WT Soil ___ Water ___ Soil Gas ✓ Atm ___

Weather Clear, Humid Barometric Pressure ____

Wind Direction & Speed Still Air Temp (°F) 105°

Surface Conditions Concrete Slab Soil Temp(°F) ____

Time & Date 1610 7/9/90 Cartridge # A= 14 B= 31

Probe Depth 20' Probe # ____ Probe Volume ____

Adapter # ____ Cylinder # ____ Vacuum Gauge Reading ____ mmHg

Sample Size 50 ml Pump Flow Rate 100 ml /@ .5 min ml/min

Purge ____ Notes ____

See PG-90-5/15 NOTES

Lab Receipt Signature Scott J. Wightman Time/Date 1900 7/10/90

Compound	Concentration (uG/L) First	Second	Comment
DCE11	1590	2280	
Chloroform	<.01	<.01	
TCA 111	2510	2050	
Carbontet	<.01	<.01	
TCE	31.1	35.4	
PCE	<.01	<.01	

APPENDIX B:

LABORATORY REPORT, EPA 601 COMPOUNDS

A+ **Environmental Testing Laboratory**

4730 N. Oracle Road, Suite 212 • Tucson, Arizona 85705 • (602) 887-1975

LABORATORY REPORT OF CHEMICAL ANALYSIS

Client: Hydro Geo Chem
1430 N. 6th Ave.
Tucson, AZ 85705

For: not submitted

Project Name	vapor analysis
Sample ID	listed below
Lab ID	041990-16, -17
Sampling Date	4/16/90
Date Received	4/19/90
Date Extracted	NA
Date of Analysis	4/26/90
Date of Report	4/30/90

EPA Method 8010– Purgeable Halocarbons (G.C. - ELCD) *

Parameter	Limit of Detection	PG-90-4-20	SVE-A-1-37			
Chloromethane	0.8	<0.8	<0.8			
Bromomethane	11.8	<11.8	<11.8			
Vinyl Chloride	1.8	<1.8	<1.8			
Chloroethane	5.2	<5.2	<5.2			
Methylene Chloride	2.5	<2.5	<2.5			
Trichlorofluoromethane	5.0	<5.0	<5.0			
1,1-Dichloroethene	1.3	89.2	29.8			
1,1-Dichloroethane	0.7	<0.7	<0.7			
trans-1,2-Dichloroethene	1.0	<1.0	<1.0			
Chloroform	0.5	58.7	12.2			
1,2-Dichloroethane	0.3	<0.3	<0.3			
1,1,1-Trichloroethane	0.3	<0.3	<0.3			
Carbon Tetrachloride	1.2	52.4	9.89			
Bromodichloromethane	1.0	<1.0	<1.0			
1,2-Dichloropropane	0.4	<0.4	<0.4			
trans-1,3-Dichloropropene	3.4	<3.4	<3.4			
Trichloroethene	1.2	3080	1020			
Dibromochloromethane	0.9	<0.9	<0.9			
1,1,2-Trichloroethane	0.2	<0.2	<0.2			
cis-1,3-Dichloropropene	2.0	<2.0	<2.0			
2-Chloroethylvinyl ether	1.3	<1.3	<1.3			
Bromoform	2.0	<2.0	<2.0			
1,1,2,2-Tetrachloroethane	0.3	<0.3	<0.3			
Tetrachloroethene	0.3	322	84.0			
Chlorobenzene	2.5	<2.5	<2.5			

Lab Notes/Comments: *reported in µg/L

Chemist Reponsible for Analysis: Patrick Rundhaug

APPENDIX J

MRD QC/QA TEST RESULTS

MRD LAB NO. 90/219

01 AUG 1990

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

Subject: Quality Control and Quality Assurance Test Results

Project: Phoenix Goodyear Airport, Goodyear, Arizona
Intended Use: Superfund
Source of Material:

Submitted by: Stan Bauer, CEMRO-ED-EA
Date Sampled: 4-20 Feb 90, Date Received: 6-21 Feb 90
Method of Test or Specification: See attached report sheets.

References: Omaha District Request No. ENE 0502 dated 24 Jan 90

-- REMARKS --

1. The samples arrived in good condition, however, there were some chain-of-custody and sample labelling problems.

2. A discussion and summary of the test results can be found on the following nine pages of text and data summary tables. Also attached please find more detailed testing information in the following appendices:

- Part A: Sample Receipt Information (3 pages)
- Part B: Chain-of-Custody Information (26 pages)
- Part C: Quality Control Test Results (92 pages)
- Part D: Sample Quality Assurance Information (22 pages)
- Part E: Quality Assurance Test Results (21 pages)
- Part F: Quality Assurance/Quality Control Data Comparison Tables (8 pages)

Submitted by:

R. K. Schlenker, P.E.
Director, MRD Laboratory

Solsky/gm/444-4304

TEST RESULTS

1. DISCUSSION

a. Twelve soil samples were analyzed for metals using EPA methods #7470 (Mercury), #7061 (Arsenic), #7741 (Selenium) and #6010 for all other metals. EP-Toxicity (method #1310) followed by analysis for metals were performed on six samples. One sample was analyzed for PCB's using method #8080. All other samples were analyzed for volatile organic (VOA) compounds using EPA method #8240. Selected samples were analyzed for Total Organic Carbon (TOC) using method #9060/#415.1. Appendix 'A' of this report lists all of the samples received and parameters assigned.

b. Several minor chain-of-custody errors were noted with the samples upon receipt at MRD Laboratory. All samples were properly preserved (refrigerated), however, some ice had melted (1/4-inch of water in the bottom of some coolers) causing some bottle labels to become wet. No bottles were broken. A pencil was used to fill out one chain-of-custody (#2399). Appendix 'B' of this report contains all chain-of-custody information and descriptions of the errors noted.

c. Sample analysis - Appendices C, D, E, F.

1) VOA - Quality Control (QC) samples were analyzed in-house at MRD Laboratory. Quality Assurance (QA) samples were sent to EHRT, Cincinnati, Ohio for analysis.

2) Metals - QC samples were analyzed in-house (MRD). QA samples (plus the QC sample labelled 'SW of Treatment Plant') were sent to EHRT for analysis. All EP-Toxicity metal samples were sent to EHRT for analysis.

3) TOC - QC samples were analyzed at EHRT. QA samples were sent to Tennessee Valley Authority (TVA), Chattanooga, TN for analysis.

4) PCB's - One QC sample was sent to EHRT for analysis.

2. DATA SUMMARY

See the attached data summary tables. Trichloroethene (TCE) was present in some samples. Trace levels of certain metals were also present. Low levels of PCB's were found in the one soil sample analyzed. Results above detection limits for TOC were seen. Only trace levels of Barium were seen in the EP-Toxicity metal samples analyzed.

3. Quality Control

a. Volatile Organics: All surrogate spike recoveries were within acceptance ranges on all samples. These recoveries are reported on each of the data report sheets for each sample analyzed. Matrix spike/matrix spike duplicate analyses were performed with all recoveries and relative percent difference (RPD) results reported within acceptance criteria. Laboratory duplicate data agreed. Laboratory Control Sample (commonly known as EPA Check Samples) analyses showed all compounds correctly identified with results within acceptance windows. Laboratory/instrument/method blanks were free of contamination. The holding times for all samples were met. There were no problems with the samples during sample analysis.

b. Metals: One extraction blank for EP-Toxicity analysis contained trace levels of arsenic, and also was present in the field samples at about the same concentration. Recoveries for all method Quality Control (spikes, etc.) samples fell within published acceptance windows. No problems were noted during sample analysis.

c. TOC: Laboratory Quality Control results were not reported, except for field duplicate data which generally showed good agreement.

d. PCB's: The surrogate spike recovery for the one sample analyzed was within acceptance criteria.

Appendix C of this report contains all field sample results, and appendix D contains all method/sample quality control results as analyzed by the appropriate Quality Control laboratory.

4. QUALITY ASSURANCE

a. No problems were reported in sample analysis by the various laboratories that served as Quality Assurance laboratory for this project. Appendix E of this report contains QA test results.

b. Quality Assurance/Quality Control Data Comparisons-(Appendix F)

1) Volatile Organics: Both the QC Lab (MRD) and QA Lab (EHRT) used method 8240 from SW-846. Within this method, two sample preparation procedures are listed. MRD used the medium level procedure (methanol extraction) resulting in detection limits being reported of about 500-μg/kg for most analytes. EHRT used the low level procedure (direct purge-and-trap of a soil/water mixture) resulting in detection limits being reported of about 3-μg/kg. Both procedures are acceptable and should not affect the quality of the data generated at both laboratories. One major data disagreement was seen in sample 'PGA-SS-004-25' (Table F4) where MRD reported TCE at 5100-μg/kg, whereas EHRT did not report finding any at a detection limit of 3.2-μg/kg. Both laboratories analyzed their second sample bottle with the same results being observed for this duplicate. It appears that both laboratories analyzed the sample correctly. One possible explaination could be sample/bottle mix-up in the field. All other VOA data agreed.

2) Metals: Data agreed (F1). There were no QA samples taken for the EP-Toxicity metals analysis.

3) TOC: Data disagreements were observed in most samples (Table 8), however, the impact of these disagreements (severity) for this project is not known.

4) PCB's: No QA split taken for the one QC sample analyzed.

PHOENIX-GOODYEAR AIRPORT

Volatile Organic Results - Summary Table

PGA Sample ID	Result(#) (dry weight)	Date Analyzed	MRD Lab Number
SB-002-05	BDL	02/09/90	900209-001
SB-002-10	BDL	02/09/90	900209-002
SB-002-15	BDL	02/09/90	900209-003
SB-002-20	BDL	02/09/90	900209-004
SB-002-25	BDL	02/09/90	900209-006
SB-002-30	BDL	02/09/90	900209-007
SB-002-35	BDL	02/09/90	900209-008
SB-002-40	BDL	02/09/90	900209-009
SB-002-45	BDL	02/13/90	900209-010
SB-002-50	BDL	02/10/90	900209-014
SB-002-55	BDL	02/12/90	900209-015
SB-002-55-QA	A	02/16/90	900209-016
SB-003-05	BDL	02/12/90	900210-001
SB-003-10	BDL	02/12/90	900210-002
SB-003-15	BDL	02/12/90	900210-004
SB-003-20	BDL	02/12/90	900210-005
SB-003-20-QC	BDL	02/12/90	900210-006
SB-003-25	BDL	02/12/90	900210-007
SB-003-25-QA	B	02/16/90	900210-008
SB-003-30	BDL	02/12/90	900210-009
SB-003-35	BDL	02/12/90	900210-013
SB-003-40	BDL	02/12/90	900210-014
SB-003-45	BDL	02/13/90	900210-015
SB-003-50	BDL	02/13/90	900210-016
SB-003-55	BDL	02/13/90	900210-017
SB-004-05	BDL	02/14/90	900214-022
SB-004-10	BDL	02/14/90	900214-023
SB-004-15	500	02/14/90	900214-025
SB-004-20	63 *	02/14/90	900214-026
SB-004-20-QC	110 *	02/14/90	900214-027
SB-004-25	5100 +	02/14/90	900214-028
SB-004-25(Lab Dup)	8700 +	02/15/90	900214-028
SB-004-25-QA	C	02/23/90	900214-029
SB-004-30	BDL	02/14/90	900214-030
SB-004-35	BDL	02/14/90	900214-034
SB-004-40	BDL	02/15/90	900214-035
SB-004-45	BDL	02/15/90	900214-036
SB-004-50	BDL	02/15/90	900214-037
SB-004-55	600 +	02/15/90	900214-038
SB-004-55(Lab Dup)	110 * +	02/21/90	900214-038

PHOENIX-GOODYEAR AIRPORT

Volatile Organic Results - Summary Table

PGA Sample ID	Result (dry weight)	Date Analyzed	MRD Lab Number
SB-005-05	BDL	02/16/90	900216-026
SB-005-10	BDL	02/16/90	900216-027
SB-005-15	BDL	02/16/90	900216-029
SB-005-20	BDL	02/16/90	900216-030
SB-005-20-QC	BDL	02/16/90	900216-031
SB-005-25	BDL	02/16/90	900216-032
SB-005-25-QA	BDL	03/01/90	900216-033
SB-005-30	BDL	02/16/90	900216-034
SB-005-35	BDL	02/16/90	900216-038
SB-005-40	BDL	02/16/90	900216-039
SB-005-45	BDL	02/19/90	900216-040
SB-005-50	BDL	02/16/90	900216-041
SB-005-55	81/110* +	02/16/90	900216-042
SB-005-55(Lab Dup)	85/74 * +	02/23/90	900216-042
SB-008-05	BDL	02/19/90	900220-004
SB-008-10	BDL	02/19/90	900220-005
SB-008-15	BDL	02/19/90	900220-007
SB-008-20	BDL	02/19/90	900220-008
SB-008-20-QC	BDL	02/19/90	900220-009
SB-008-25	BDL	02/19/90	900220-010
SB-008-25-QA	BDL	03/01/90	900220-011
SB-008-30	BDL	02/19/90	900220-012
SB-008-35	BDL	02/19/90	900220-016
SB-008-40	BDL	02/21/90	900220-017
SB-008-45	BDL	02/21/90	900220-018
SB-008-50	BDL	02/21/90	900220-019
SB-008-55	BDL	02/21/90	900220-020
SB-007-05	BDL	02/21/90	900221-007
SB-007-10	BDL	02/21/90	900221-008
SB-007-15	BDL	02/21/90	900221-010
SB-007-20	BDL	02/21/90	900221-011
SB-007-20-QC	BDL	02/22/90	900221-012
SB-007-25	BDL	02/22/90	900221-013
SB-007-25-QA	BDL	02/23/90	900221-014
SB-007-30	BDL	02/22/90	900221-015
SB-007-35	BDL	02/22/90	900221-019
SB-007-40	BDL	02/22/90	900221-020
SB-007-45	BDL	02/22/90	900221-021
SB-007-50	BDL	02/22/90	900221-022
SB-007-55	BDL	02/22/90	900221-023

PHOENIX-GOODYEAR AIRPORT

Volatile Organic Results - Summary Table Definitions

BDL: Below Detection Limit (practical quantitation limit). Units = ug/kg.

#: Only Trichloroethene (TCE) was present in these samples. The lowest practical quantitation limit for TCE is approximately 200-ug/kg dry weight. The practical quantitation limit for most of the other chlorinated and aromatic analytes is about 500-ug/kg dry weight. For the more water soluble analytes, (acetone, 2-butanone, etc.), the practical quantitaion limit is about 3000-ug/kg dry weight. As requested by Steve Pearson (CEMRO-ED-GC) and Kevin Coats (CEMRD-ED-GC), the lowest possible detection limit for TCE is to be reported since it is the most likely contaminate to be found on the site. This lower limit (200 ppb vs. 500 ppb) for TCE required a time consuming and extensive data review and verification. Reporting lower detection limits for all analytes is not practical due to the number of samples analyzed, (in a relatively short time period), and amount of time needed to conduct the proper data review.

All method Quality Control parameters, (blanks, matrix spikes, matrix spike duplicates and surrogate standard recoveries), were within Contract Laboratory Program acceptance criteria. No problems were encountered when analyzing these samples.

*: Below the lowest practical quanitation limit. These values reported are "estimations" only and are to be used only to show that TCE appears to be present, but at very low levels.

+: Both bottles used in sample preparation to verify the presence of TCE. Since both bottles appear to contain TCE, the contaminate appears to be from the site, not laboratory introduced.

A: Low level analysis from SW-846, method 8240 was used by the QA laboratory, whereas the medium level analysis procedure was used by the Contract laboratory. The QA lab reported trace levels of benzene (47), toluene (22), ethylbenzene (92) and 1,2-dichloroethene (27-μg/kg) in this sample which is an order of magnitude below the detection limits set by the contract laboratory.

B: QA laboratory reported 38-μg/kg toluene in this sample.

C: QA laboratory reported Below Detection Limit for all volatile organics in this sample (also analyzed in duplicate). One possible explanation could be a sample mix-up most likely to have occurred in the field.

PHOENIX-GOODYEAR AIRPORT

Metals Results - Summary Table

units = mg/kg (dry weight)

Metal/ID	PGA-SS-011	PGA-SS-010	-010-QC	PGA-SS-009
Antimony	<50	<50	<50	<50
Arsenic	3.3	3.3	3.8	3.1
Beryllium	3	<2	<2	<2
Cadmium	<3	<3	<3	<3
Chromium	29	44	43	17
Copper	20	51	44	13
Lead	11	21	15	<10
Mercury	<0.05	<0.05	0.06	<0.05
Nickel	14	14	14	10
Silver	<10	<10	<10	<10
Selenium	<0.2	<0.2	<0.2	<0.2
Thallium	<100	<100	<100	<100
Zinc	50	53	54	32

Metal — SW of Treatment Plant — PCB

(units = mg/kg) dry weight

Metal	
Aluminum	19000
Antimony	<1.6
Arsenic	<0.34
Beryllium	0.73
Cadmium	77.9
Chromium	758
Copper	18100
Iron	21800
Lead	1370
Manganese	1480
Mercury	0.1
Nickel	238
Selenium	1.5
Silver	11.1
Thallium	<146
Zinc	3630

PCB (units = ug/kg)

PCB	
Aroclor-1016	<28
Aroclor-1221	<28
Aroclor-1232	<28
Aroclor-1242	<28
Aroclor-1248	<28
Aroclor-1254	266
Aroclor-1260	<28

PHOENIX-GOODYEAR AIRPORT

Total Organic Carbon Results - Summary Table

PGA Sample ID	Result
	(dry weight, units = mg/kg)
PGA-SB-002-20	21970
PGA-SB-002-45	<250
PGA-SB-002-45-QC	<250
PGA-SB-003-10	9575
PGA-SB-003-30	<250
PGA-SB-003-30	257
PGA-SB-004-10	15784
PGA-SB-004-30	308
PGA-SB-004-30-QC	<250
PGA-SB-005-10	640
PGA-SB-005-30	<250
PGA-SB-005-30-QC	<250
PGA-SB-008-10	26121
PGA-SB-008-30	<250
PGA-SB-008-30-QC	272
PGA-SB-007-10	5237
PGA-SB-007-30	278
PGA-SB-007-30-QC	<250

PHOENIX-GOODYEAR AIRPORT

EP-Toxicity Metals Results - Summary Table

units = $\mu g/L$

Metal/ID	PGA-SB-002-DRUM	PGA-SB-003-DRUM
Arsenic	5.4 B	5.5 B
Barium	153	58.3
Cadmium	<3.6	<3.6
Chromium	<4.7	<4.7
Lead	<12.7	<12.7
Mercury	<0.1	<0.1
Selenium	<1.8	<1.8
Silver	<4.7	<4.7

Metal/ID	PGA-SB-004-DRUM	PGA-SB-005-DRUM
Arsenic	4.7 B	4.9 B
Barium	270	291
Cadmium	<3.6	<3.6
Chromium	<4.7	<4.7
Lead	<12.7	<12.7
Mercury	<0.1	<0.1
Selenium	<1.8	<1.8
Silver	<4.7	<4.7

Metal/ID	PGA-SB-008-DRUM	PGA-SB-007-DRUM
Arsenic	3.9 B	4.4 B
Barium	209	<1.7
Cadmium	<3.6	<3.6
Chromium	<4.7	<4.7
Lead	<12.7	<12.7
Mercury	<0.1	<0.1
Selenium	<1.8	<1.8
Silver	<4.7	<4.7

B = also found in blank.

PART A

SAMPLE RECEIPT INFORMATION

#	Customer Sample #	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	Test Results Page Number
001	PGA-SS-011	04 Feb 90	Soil	900207-001	Metals	C1
002	PGA-SS-010	04 Feb 90	Soil	900207-002	Metals	C2
003	PGA-SS-010-QA	04 Feb 90	Soil	900207-003	Metals (to EHRT)	E2
004	PGA-SS-010-QC	04 Feb 90	Soil	900207-004	Metals	C3
005	SW of Treatmnt Plnt	04 Feb 90	Soil	900207-005	PCB's & Metals (to EHRT)	C85-C86
006	PGA-SS-009	04 Feb 90	Soil	900207-006	Metals	C4
007	PGA-SB-002-05	08 Feb 90	Soil	900209-001	VOA	C5
008	PGA-SB-002-10	08 Feb 90	Soil	900209-002	VOA	C6
009	PGA-SB-002-15	08 Feb 90	Soil	900209-003	VOA	C7
010	PGA-SB-002-20	08 Feb 90	Soil	900209-004 900209-005	VOA TOC (to EHRT)	C8 C9
011	PGA-SB-002-25	08 Feb 90	Soil	900209-006	VOA	C10
012	PGA-SB-002-30	08 Feb 90	Soil	900209-007	VOA	C11
013	PGA-SB-002-35	08 Feb 90	Soil	900209-008	VOA	C12
014	PGA-SB-002-40	08 Feb 90	Soil	900209-009	VOA	C13
015	PGA-SB-002-45	08 Feb 90	Soil	900209-010 900209-011	VOA TOC (to EHRT)	C14 C9
016	PGA-SB-002-45-QA	08 Feb 90	Soil	900209-012	TOC (to TVA)	E16
017	PGA-SB-002-45-QC	08 Feb 90	Soil	900209-013	TOC (to EHRT)	C9
018	PGA-SB-002-50	08 Feb 90	Soil	900209-014	VOA	C15
019	PGA-SB-002-55	08 Feb 90	Soil	900209-015	VOA	C16
020	PGA-SB-002-55-QA	08 Feb 90	Soil	900209-016	VOA (to EHRT)	E5
021	PGA-SB-002 Drum	08 Feb 90	Soil	900209-017	EP-Toxicity Metals (to EHRT)	C89
022	PGA-SB-003-05	09 Feb 90	Soil	900210-001	VOA	C17
023	PGA-SB-003-10	09 Feb 90	Soil	900210-001 900210-003	VOA TOC (to EHRT)	C18 C9
024	PGA-SB-003-15	09 Feb 90	Soil	900210-004	VOA	C19
025	PGA-SB-003-20	09 Feb 90	Soil	900210-005	VOA	C20
026	PGA-SB-003-20-QC	09 Feb 90	Soil	900210-006	VOA	C21
027	PGA-SB-003-25	09 Feb 90	Soil	900210-007	VOA	C22
028	PGA-SB-003-25-QA	09 Feb 90	Soil	900210-008	VOA (to EHRT)	E7
029	PGA-SB-003-30	09 Feb 90	Soil	900210-009 900210-010	VOA TOC (to EHRT)	C23 C9
030	PGA-SB-003-30-QC	09 Feb 90	Soil	900210-011	TOC (to EHRT)	C9
031	PGA-SB-003-30-QA	09 Feb 90	Soil	900210-012	TOC (to TVA)	E17
032	PGA-SB-003-35	09 Feb 90	Soil	900210-013	VOA	C24

#	Customer Sample #	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	Test Results Page Number
033	PGA-SB-003-40	09 Feb 90	Soil	900210-014	VOA	C25
034	PGA-SB-003-45	09 Feb 90	Soil	900210-015	VOA	C26
035	PGA-SB-003-50	09 Feb 90	Soil	900210-016	VOA	C27
036	PGA-SB-003-55	09 Feb 90	Soil	900210-017	VOA	C28
037	Drum Composite	09 Feb 90	Soil	900210-018	EP-Toxicity Metals (to EHRT)	C90
038	PGA-SB-004-05	13 Feb 90	Soil	900214-022	VOA	C29
039	PGA-SB-004-10	13 Feb 90	Soil	900214-023 900214-024	VOA TOC (to EHRT)	C30 C31
040	PGA-SB-004-15	13 Feb 90	Soil	900214-025	VOA	C32
041	PGA-SB-004-20	13 Feb 90	Soil	900214-026	VOA	C33-C34
042	PGA-SB-004-20-QC	13 Feb 90	Soil	900214-027	VOA	C35-C36
043	PGA-SB-004-25	13 Feb 90	Soil	900214-028	VOA	C37-C38
044	PGA-SB-004-25-QA	13 Feb 90	Soil	900214-029	VOA	E9
045	PGA-SB-004-30	13 Feb 90	Soil	900214-030 900214-031	VOA TOC (to EHRT)	C39 C31
046	PGA-SB-004-30-QA	13 Feb 90	Soil	900214-032	TOC (to TVA)	E18
047	PGA-SB-004-30-QC	13 Feb 90	Soil	900214-033	TOC (to EHRT)	C31
048	PGA-SB-004-35	13 Feb 90	Soil	900214-034	VOA	C40
049	PGA-SB-004-40	13 Feb 90	Soil	900214-035	VOA	C41
050	PGA-SB-004-45	13 Feb 90	Soil	900214-036	VOA	C42
051	PGA-SB-004-50	13 Feb 90	Soil	900214-037	VOA	C43
052	PGA-SB-004-55	13 Feb 90	Soil	900214-038	VOA	C44-C45
053	PGA-SB-004-(0-55')	13 Feb 90	Soil	900214-039	EP-Toxicity Metals (to EHRT)	C87
054	PGA-SB-005-05	15 Feb 90	Soil	900216-026	VOA	C46
055	PGA-SB-005-10	15 Feb 90	Soil	900216-027 900216-028	VOA TOC (to EHRT)	C47 C48
056	PGA-SB-005-15	15 Feb 90	Soil	900216-029	VOA	C49
057	PGA-SB-005-20	15 Feb 90	Soil	900216-030	VOA	C50
058	PGA-SB-005-20-QC	15 Feb 90	Soil	900216-031	VOA	C51
059	PGA-SB-005-25	15 Feb 90	Soil	900216-032	VOA	C52
060	PGA-SB-005-25-QA	15 Feb 90	Soil	900216-033	VOA (to EHRT)	E11
061	PGA-SB-005-30	15 Feb 90	Soil	900216-034 900216-035	VOA TOC (to EHRT)	C53 C48
062	PGA-SB-005-30-QA	15 Feb 90	Soil	900216-036	TOC (to TVA)	E19
063	PGA-SB-005-30-QC	15 Feb 90	Soil	900216-037	TOC (to EHRT)	C48
064	PGA-SB-005-35	15 Feb 90	Soil	900216-038	VOA	C54
065	PGA-SB-005-40	15 Feb 90	Soil	900216-039	VOA	C55
066	PGA-SB-005-45	15 Feb 90	Soil	900216-040	VOA	C56
067	PGA-SB-005-50	15 Feb 90	Soil	900216-041	VOA	C57

#	Customer Sample #	Date Sampled	Matrix	MRD Lab # Assigned	Tests Assigned	Test Results Page Number
068	PGA-SB-005-55	15 Feb 90	Soil	900216-042	VOA	C58-C59
069	Composite Barrel Sample	15 Feb 90	Soil	900216-043	EP-Toxicity Metals (to EHRT)	C88
070	PGA-SB-008-05	16 Feb 90	Soil	900220-004	VOA	C60
071	PGA-SB-008-10	16 Feb 90	Soil	900220-005 900220-006	VOA TOC (to EHRT)	C61 C48
072	PGA-SB-008-15	16 Feb 90	Soil	900220-007	VOA	C62
073	PGA-SB-008-20	16 Feb 90	Soil	900220-008	VOA	C63
074	PGA-SB-008-20-QC	16 Feb 90	Soil	900220-009	VOA	C64
075	PGA-SB-008-25	16 Feb 90	Soil	900220-010	VOA	C65
076	PGA-SB-008-25-QA	16 Feb 90	Soil	900220-011	VOA (to EHRT)	E12
077	PGA-SB-008-30	16 Feb 90	Soil	900220-012 900220-013	VOA TOC (to EHRT)	C66 C48
078	PGA-SB-008-30-QA	16 Feb 90	Soil	900220-014	TOC (to TVA)	E20
079	PGA-SB-008-30-QC	16 Feb 90	Soil	900220-015	TOC (to EHRT)	C48
080	PGA-SB-008-35	16 Feb 90	Soil	900220-016	VOA	C67
081	PGA-SB-008-40	16 Feb 90	Soil	900220-017	VOA	C68
082	PGA-SB-008-45	16 Feb 90	Soil	900220-018	VOA	C69
083	PGA-SB-008-50	16 Feb 90	Soil	900220-019	VOA	C70
084	PGA-SB-008-55	16 Feb 90	Soil	900220-020	VOA	C71
085	Barrel Composite	16 Feb 90	Soil	900220-021	EP-Toxicity Metals (to EHRT)	C91
086	PGA-SB-007-05	19 Feb 90	Soil	900221-007	VOA	C72
087	PGA-SB-007-10	19 Feb 90	Soil	900221-008 900221-009	VOA TOC (to EHRT)	C73 C74
088	PGA-SB-007-15	19 Feb 90	Soil	900221-010	VOA	C75
089	PGA-SB-007-20	19 Feb 90	Soil	900221-011	VOA	C76
090	PGA-SB-007-20-QC	19 Feb 90	Soil	900221-012	VOA	C77
091	PGA-SB-007-25	19 Feb 90	Soil	900221-013	VOA	C78
092	PGA-SB-007-25-QA	19 Feb 90	Soil	900221-014	VOA (to EHRT)	E14-E15
093	PGA-SB-007-30	19 Feb 90	Soil	900221-015 900221-016	VOA TOC (to EHRT)	C79 C74
094	PGA-SB-007-30-QA	19 Feb 90	Soil	900221-017	TOC (to TVA)	E21
095	PGA-SB-007-30-QC	19 Feb 90	Soil	900221-018	TOC (to EHRT)	C74
096	PGA-SB-007-35	19 Feb 90	Soil	900221-019	VOA	C80
097	PGA-SB-007-40	19 Feb 90	Soil	900221-020	VOA	C81
098	PGA-SB-007-45	19 Feb 90	Soil	900221-021	VOA	C82
099	PGA-SB-007-50	20 Feb 90	Soil	900221-022	VOA	C83
100	PGA-SB-007-55	20 Feb 90	Soil	900221-023	VOA	C84
101	Barrel Composite	20 Feb 90	Soil	900221-024	EP-Toxicity Metals (to EHRT)	C92

PART B

CHAIN-OF-CUSTODY INFORMATION

Page No.	Chain-of-Custody No.	Date Signed
B1	0117	05 Feb 90
B3	1322	08 Feb 90
B4	1321	08 Feb 90
B7	0106	09 Feb 90
B8	0105	09 Feb 90
B11	2390	-- --- --
B12	2400	-- --- --
B15	2340	15 Feb 90
B16	2349	15 Feb 90
B19	0107	16 Feb 90
B20	1323	16 Feb 90
B23	2341	20 Feb 90
B24	2399	20 Feb 90

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* A. Pearson, P Brockman

NO. OF CONTAINERS

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Metals						REMARKS
34A	2/2/90			X	Site 34A/Davis Monthan	2							4oz jars ; hold for analysis; soil
34B	2/2/90			X	Site 34B/Davis Monthan	2							4oz jars ; hold for analysis; soil
PG90-11	2/4/90	1425	X		PGA-SS-011	1	X						8oz jar ; soil
PG90-10	2/4/90	1455	X		PGA-SS-010	1	X						8oz jar ; soil
PG90-10	2/4/90	1455	X		PGA-SS-010-QA	1	X						8oz jar ; split ; soil
PG90-10	2/4/90	1455	X		PGA-SS-010-QC	1	X						8oz jar ; duplicate ; soil
	2/4/90	1512		X	SW of Treatment Plant	1							8oz jar ; smelter ash ('dross') hold for analysis
PG90-9	2/4/90	1525	X		PGA-SS-009	1	X						8oz jar ; soil

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Steven F. Pearson	2/5/90 1653	Joe Wiatt 2/5/90 @ 1653 Fed EXP. LUFA			

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		Carol L Gerson	2-6-90 11:00	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

B2

COOLER RECEIPT FORM

MRD Cooler # 8

PROJECT: Phoenix Goodyear Airport Date received: 2-6-90

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 2-6-90

by (print) Conrad German (sign) Conrad German

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

If YES, enter carrier name & air bill number here: Federal Express : 974887381

2. Were custody seals on outside of cooler? .... YES NO

If YES, how many & where: 2 - one front - one back of lid

If YES, enter the following: seal date: 2-5-90, seal name: S. Pearson (Steven)

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO
4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO
5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO
6. Did you sign custody papers in the appropriate place? .... YES NO
7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO
8. If required, was enough ice used? .... Regular .... YES NO
9. Have designated person initial here to acknowledge receipt of cooler: RDK (date) 2-7-90

B. LOG-IN PHASE: Date samples were logged-in: 2-7-90

by (print) Conrad German / Brad Brink (sign) Conrad German / Brad Brink

10. Describe type of packing in cooler: Styrofoam Worms
11. Were all bottles sealed in separate plastic bags? .... YES NO
12. Did all bottles arrive unbroken & were labels in good condition? .... YES NO
13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO
14. Did all bottle labels agree with custody papers? QA/QC for SS was selected from X90-10 .... YES NO
15. Were correct containers used for the tests indicated? .... YES NO
16. Were correct preservatives used when required? .... ~~YES NO~~ N/A
17. Was a sufficient amount of sample sent for tests indicated? .... YES NO
18. Were bubbles absent in VOA samples? If NO, list by QA#: ____ ~~YES NO~~ N/A
19. Was the shipment accepted? .... YES NO
20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

21. Who was called ? ____ By whom ? ____ (date) ____

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* Steve Pearson   P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC						REMARKS
PG90-2	2/8/90	1725		X	PGA-SB-002-55/QA	2	X						2-4oz jars; soil; ~~duplicate~~ split
PG90-2	2/8/90	1055-1725	X		PGA-SB-002/Drum	1							1-8oz jar; soil; hold for analysis

NOTE: No QC taken for VOC; inadequate sample volume.

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Steven Pearson	2/8/90 1811	+ FED-EXP. refused to sign			
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		Carol D. [illegible]	2-9-90 1030	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

BJ U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: (Signature) Steve Pearson P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG90-2	2/8/90	1055		X	PGA-SB-002-05	2	X						2-4oz jars; soil
PG90-2	2/8/90	1315		X	PGA-SB-002-10	2	X						2-4oz jars; soil
PG90-2	2/8/90	1340		X	PGA-SB-002-15	2	X						2-4oz jars; soil
PG90-2	2/8/90	1400		X	PGA-SB-002-20	2	X						2-4oz jars; soil
PG90-2	2/8/90	1400	X		PGA-SB-002-20/TOC	1		X					1-8oz jar; soil
PG90-2	2/8/90	1415		X	PGA-SB-002-25	2	X						2-4oz jars; soil
PG90-2	2/8/90	1445		X	PGA-SB-002-30	2	X						2-4oz jars; soil
PG90-2	2/8/90	1500		X	PGA-SB-002-35	2	X						2-4oz jars; soil
PG90-2	2/8/90	1525		X	PGA-SB-002-40	2	X						2-4oz jars; soil
PG90-2	2/8/90	1600		X	PGA-SB-002-45	2	X						2-4oz jars; soil
PG90-2	2/8/90	1600	X		PGA-SB-002-45/TOC	1		X					1-8oz jar; soil
PG90-2	2/8/90	1600	X		PGA-SB-002-45/TOC-QA	1		X					1-8oz jar; soil; split
PG90-2	2/8/90	1600	X		PGA-SB-002-45/TOC-QC	1		X					1-8oz jar; soil; duplicate
PG90-2	2/8/90	1645		X	PGA-SB-002-50	2	X						2-4oz jar; soil
PG90-2	2/8/90	1725		X	PGA-SB-002-55	2	X						2-4oz jars; soil

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steven F Pearson	2/8/90 1811	→ FED EXP. refused to sign			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Conrad L Pearson	2-9-90 10:30		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

B5

COOLER RECEIPT FORM

MRD Cooler # 112

PROJECT: Phoenix Goodyear Airport Date received: 2-9-90

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 2-9-90

by (print) Conrad L. German (sign) Conrad L German

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

If YES, enter carrier name & air bill number here: Federal Express: 9748871370

2. Were custody seals on outside of cooler? .... YES NO

If YES, how many & where: Two (2) - one front & one back of lid.

If YES, enter the following: seal date: 2-8-90, seal name: Steven G. Pearson

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO

4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO

5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO

6. Did you sign custody papers in the appropriate place? .... YES NO

7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO

8. If required, was enough ice used? .... Regular .... YES NO

9. Have designated person initial here to acknowledge receipt of cooler: RDK (date) 2-9-90

B. LOG-IN PHASE: Date samples were logged-in: 2-9-90

by (print) Conrad L. German / Brad Brink (sign) Conrad L German / Brad Brink

10. Describe type of packing in cooler: Styrofoam worms

11. Were all bottles sealed in separate plastic bags? .... YES NO

12. Did all bottles arrive unbroken & were labels in good condition? .... YES NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO

14. Did all bottle labels agree with custody papers? .... YES NO

15. Were correct containers used for the tests indicated? .... YES NO

16. Were correct preservatives used when required? .... YES NO

17. Was a sufficient amount of sample sent for tests indicated? .... YES NO

18. Were bubbles absent in VOA samples? If NO, list by QA#: N/A ~~YES NO~~

19. Was the shipment accepted? .... YES NO

20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

21. Who was called ? ________ By whom ? ________ (date) ________

B6

14. Bottle labels for all ID of TOC analyses samples did not include the depth whereas the COC IDs for TOC analyses samples does include the depth (number of feet deep).

14. Samples 900209-012 & -013
have COC IDs as follows: PGA-SB-002-45/TOC-QA
PGA-SB-002-45/TOC-QC

Bottle label IDs as follows: PGA-SB-002-QA/TOC
PGA-SB-002-QC/TOC

14. Sample 900209-017 for Hold ~~has~~ has no sample ID on the bottle label.

COC states: PGA-SB-002/Drum

#5). Entry in the "Received by" box on the COC should have been in the "Remarks" box.
(Federal Express isn't required to sign.)

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: PGA
PROJECT NAME: Phoenix Goodyear Airport
SAMPLERS: (Signature) [signature] P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG90-3	2/9/90	1510		X	PGA-SB-003-05	2	X						2-4oz jars; soil; fieldscreen .6ppm
PG90-3	2/9/90	1520		X	PGA-SB-003-10	2	X						2-4oz jars; soil; fieldscreen 1.6ppm
PG90-3	2/9/90	1530		X	PGA-SB-003-15	2	X						2-4oz jars; soil; fieldscreen .4 ppm
PG90-3	2/9/90	1545		X	PGA-SB-003-20	2	X						2-4oz jars; soil; fieldscreen 2.3ppm
PG90-3	2/9/90	1545		X	PGA-SB-003-20/QC	2	X						2-4oz jars; soil; duplicate
PG90-3	2/9/90	1520	X		PGA-SB-003-10/TOC	1		X					1-8oz jar; soil;
PG90-3	2/9/90	1555		X	PGA-SB-003-25	2	X						2-4oz jars; soil; fieldscreen 2.5ppm
PG90-3	2/9/90	1555		X	PGA-SB-003-25/QA	2	X						2-4oz jars; soil; split
PG90-3	2/9/90	1625		X	PGA-SB-003-30	2	X						2-4oz jars; soil; fieldscreen 3.2ppm
PG90-3	2/9/90	1640		X	PGA-SB-003-35	2	X						2-4oz jars; soil; fieldscreen 1.2ppm
PG90-3	2/9/90	1625	X		PGA-SB-003-30/TOC	1		X					1-8oz jar; soil
PG90-3	2/9/90	1625	X		PGA-SB-003-30/TOC-QC	1		X					1-8oz jar; soil;
PG90-3	2/9/90	1625	X		PGA-SB-003-30/TOC-QA	1		X					1-8oz jar; soil
PG90-3	2/9/90	1655		X	PGA-SB-003-40	2	X						2-4oz jars; soil; fieldscreen 1.2ppm
PG90-3	2/9/90	1715		X	PGA-SB-003-45	2	X						2-4oz jars; soil; fieldscreen .2 ppm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	2/9/90 1825				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		[signature]	2-10-90 1000	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

8

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* J. Pearson P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC						REMARKS
PG90-3	2/9/90	1730		X	PGA-SB-003-50	2	X						2-4oz jars; soil; fieldscreen 1.1 ppm
PG90-3	2/9/90	1755		X	PGA-SB-003-55	2	X						2-4oz jars; soil; fieldscreen 1.2 ppm
PG90-3	2/9/90	1510-1755	X		Drum Composite	1							1-8oz jar; soil; hold for analysis

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
J. Pearson	2/9/90 1825				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		Carol [illegible]	2-10-90 1000	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

(499) Superfund B9

COOLER RECEIPT FORM

MRD Cooler # 115

PROJECT: Phoenix Goodyear Airport Date received: 2-10-90

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 2-10-90

by (print) Conrad German (sign) Conrad L German

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

If YES, enter carrier name & air bill number here: Federal Express: 9748871382

2. Were custody seals on outside of cooler? .... YES NO

If YES, how many & where: Two (2) - one front - one back of lid.

If YES, enter the following: seal date: 2-9-90, seal name: Steve Pearson

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO
4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO
5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO
6. Did you sign custody papers in the appropriate place? .... YES NO
7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO
8. If required, was enough ice used? .... Regular - one large block .... YES NO
9. Have designated person initial here to acknowledge receipt of cooler: RDK (date) 2-12-90

B. LOG-IN PHASE: Date samples were logged-in: 2-10-90

by (print) Conrad L. German / Brad Brink (sign) Conrad L German / Brad Brink

10. Describe type of packing in cooler: Styrofoam worms
11. Were all bottles sealed in separate plastic bags? .... YES NO
12. Did all bottles arrive unbroken & were labels in good condition? .... YES NO
13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO
14. Did all bottle labels agree with custody papers? .... YES NO
15. Were correct containers used for the tests indicated? .... YES NO
16. Were correct preservatives used when required? .... YES NO
17. Was a sufficient amount of sample sent for tests indicated? .... YES NO
18. Were bubbles absent in VOA samples? If NO, list by QA#: N/A ~~YES NO~~
19. Was the shipment accepted? .... YES NO
20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

21. Who was called ? ________ By whom ? ________ (date) ________

14. Sample "900210-003" has C-OC ID of: PGA-SB-003-10/TOC
and bottle label ID of: PGA-SB-003/TOC

Samples 900210-006 have C-O-C I.D. of: PGA-SB-003-20/QC
and bottle label ID of: PGA-SB-003-QC

Sample 900210-010 has C-O-C ID of PGA-SB-003-30/TOC
and bottle label ID of PGA-SB-003/TOC

Sample 900210-011 has C-O-C ID of PGA-SB-003-30/TOC-QC
and bottle label of PGA-SB-003-QC/TOC

Sample 900210-012 has a C-O-C ID of PGA-SB-003-30/TOC-QA
and bottle label of PGA-SB-003-QA/TOC

Sample 900210-018 has "time" entry on C-O-C as 1510-1755
and "Time" entry on bottle label as 1510-

* ½" of water in bottom of cooler on arrival.
\- many bottle labels were wet probably due to condensation.
one large block of ice in only a single plastic bag
with holes in it. (Should at least be double bagged.)

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: PGA

PROJECT NAME: Phoenix Goodyear Airport

SAMPLERS: (Signature) P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PGA-4	2-13-90	10:32		X	PGA-SB-004-05/VOC	2X	X						2-4oz jars; soil, fieldscreen 13ppm
		10:50		X	PGA-SB-004-10/VOC	2X	X						" " " " " 30ppm
		10:50	X		PGA-SB-004-1/TOC	1X		X					1-8oz jar; soil, fieldscreen 30ppm
		11:00		X	PGA-SB-004-15/VOC	2X	X						2-4oz jars; soil, fs = 45ppm
		11:14		X	PGA-SB-004-20/VOC	2X	X						" " " " " = 55ppm
		11:14		X	PGA-SB-004-CC/VOC	2X	X						" " " " " = 55ppm
		11:31		X	PGA-SB-004-35/VOC	2X	X						" " " " " = 70ppm
		11:31		X	PGA-SB-004-QA/VOC	2X	X						" " " " " = 70ppm
		12:58		X	PGA-SB-004-30/VOC	2X	X						" " " " " = 30ppm
		12:58	X		PGA-SB-004/TOC	1X		X					1-8oz jar, soil fs = 30ppm
		12:58	X		PGA-SB-004-QA/TOC	1X		X					" " " " " = 30ppm
		12:58	X		PGA-SB-004-CC/TOC	1X		X					" " " " " = 30ppm
		13:10		X	PGA-SB-004-35/VOC	2X	X						2, 4oz jars, soil fs = 40ppm
		13:32		X	PGA-SB-004-40/VOC	2X	X						" " " " " = 20ppm
↓	↓	14:20		X	PGA-SB-004-45/VOC	2X	X						" " " " " = 40ppm

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Perry Brockman					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		Carol L. German	2-14-90 1000	Not cold - cool

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: PGA

PROJECT NAME: Phoenix Goodyear Airport

SAMPLERS: (Signature) P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG-90-4	2-13-90	1450		X	PGA-SB-004-50/VOC	2X	X						2-4 oz jars, soil, field screen = 11 ppm
		1512		X	PGA-SB-004-55/VOC	2X	X						" " " " " = 30 ppm
		"	X		PGA-SB-004 0-55'								
					TOC	1X		X					1-8 oz jar soil

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Perry Brockman					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		Conrad [illegible]	2-14-90 1000	Not Cold — cool

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

499

B13

COOLER RECEIPT FORM

MRD Cooler # 20

PROJECT: Phoenix Goodyear Airport Date received: 2-14-90

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 2-14-90

by (print) Conrad L. German / Brad Brink (sign) Conrad L. German / Brad Brink

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO — YES

   If YES, enter carrier name & air bill number here: Federal Express: 3889713590

2. Were custody seals on outside of cooler? .... YES NO — YES

   If YES, how many & where: 2 — one front one back of lid

   If YES, enter the following: seal date: 2-13-90, seal name: Penny Brockman

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO — YES
4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO — YES
5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO — YES
6. Did you sign custody papers in the appropriate place? .... YES NO — YES
7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO — YES
8. If required, was enough ice used? ...One block of regular ice at bottom of cooler YES NO — NO
9. Have designated person initial here to acknowledge receipt of cooler: RDK (date) 2-14-90

B. LOG-IN PHASE: Date samples were logged-in: 2-14-90

by (print) Conrad L German / Brad Brink (sign) Conrad L German / Brad Brink

10. Describe type of packing in cooler: Styrofoam worms
11. Were all bottles sealed in separate plastic bags? .... YES NO — YES
12. Did all bottles arrive unbroken & were labels in good condition? .... YES NO — YES
13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO — YES
14. Did all bottle labels agree with custody papers? .... YES NO — NO
15. Were correct containers used for the tests indicated? .... YES NO — YES
16. Were correct preservatives used when required? .... N/A ~~YES NO~~
17. Was a sufficient amount of sample sent for tests indicated? .... YES NO — YES
18. Were bubbles absent in VOA samples? If NO, list by QA#: N/A ~~YES NO~~
19. Was the shipment accepted? .... YES NO — YES
20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

21. Who was called ? ______ By whom ? ______ (date)______

14. For All TOC analysis samples the COC and the bottle labels did not include the depth number of the sample ID's.

14. Sample 900214-039 was identified as PGA-SB-004 0-55' on the C-O-C. This sample is probably a composite — Not mentioned on the COC.

Also the C-O-C indicates TOC for analysis of this sample while the bottle label depicts "Hold for analysis."

B15

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phenix Goodyear Airport

SAMPLERS: *(Signature)* P. Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC	REMARKS
PG-90-5	2-15-90	9:15		X	PGA-SB-005-05/VOC	2X	X		2-4oz jars, soil, field screen = 1.2 ppm
		9:23		X	PGA-SB-005-10/VOC	2X	X		" " " " " = .4ppm
		"	X		PGA-SB-005/TOC	1X		X	1-8oz jar " " "
		9:30		X	PGA-SB-005-15/VOC	2X	X		2-4oz jar, soil, field scrn = 12 ppm
		9:45		X	PGA-SB-005-20/VOC	2X	X		" " " " " 5ppm
		"		X	PGA-SB-005-QC/VOC	2X	X		" " " " " 5ppm
		9:57		X	PGA-SB-005-QA/VOC	2X	X		2-4oz jar, soil, field scrn = 18ppm
				X	PGA-SB-005-25/VOC	2X	X		" " " " " 18ppm
		10:15		X	PGA-SB-005-30/VOC	2X	X		" " " " " = 7ppm
		"	X		PGA-SB-005/TOC	1X	~~X~~	X	1-8 oz jar soil, field sc = 7ppm
		"	X		PGA-SB-005-QA/TOC	1X		X	" " " " "
		"	X		PGA-SB-005-QC/TOC	1X		X	" " " " " "
		10:52		X	PGA-SB-005-35/VOC	2X	X		2-4oz jars, soil, fieldscr = 3ppm
		11:03		X	PGA-SB-005-40/VOC	2X	X		" " " " " = 2.5ppm
		11:18		X	PGA-SB-005-45/VOC	2X	X		2-4oz jars, soil, field scr = 5ppm

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Penny Brockman	2-15-90 / 13:30				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		Conrad D. [illegible]	2-16-90 / 1030	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

B16

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME					NO. OF CON-TAINERS	VOC	TOC					REMARKS
PG-A	Phoenix Goodyear Airport												
SAMPLERS: *(Signature)* Penny Brockman													
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
PE90-5	2-15-90	11:35		X	PG-A-SB-005-50/VOC	2X	X						2-4oz jar, soil, field scrn = 7ppm
		11:52		X	PG-A-SB-005-55/VOC	2X	X						2-4oz jar, soil, field scrn =
		"	X		Composite Barrel Sample	1X		X					1-8oz jar soil field scrn =

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Penny Brockman	2-15-90 / 17:30				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[illegible signature]	2-16-90 / 1030	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

2349

(449) Superfund

B17

COOLER RECEIPT FORM

MRD Cooler # 18

PROJECT: Phoenix Goodyear Airport Date received: 2-16-90

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 2-16-90

by (print) Conrad German (sign) Conrad L German

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

   If YES, enter carrier name & air bill number here: Federal Express: 4669229880

2. Were custody seals on outside of cooler? .... YES NO

   If YES, how many & where: 2 - one front - one back of lid.

   If YES, enter the following: seal date: 2-15-90, seal name: Penny Brockman

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO
4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO
5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO
6. Did you sign custody papers in the appropriate place? .... YES NO
7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO
8. If required, was enough ice used? .... YES NO
9. Have designated person initial here to acknowledge receipt of cooler: EDK (date) 2-16-90

B. LOG-IN PHASE: Date samples were logged-in: 2-16-90

by (print) Conrad L. German (sign) Conrad L German

10. Describe type of packing in cooler: Styrofoam worms
11. Were all bottles sealed in separate plastic bags? .... YES NO
12. Did all bottles arrive unbroken & were labels in good condition? .... YES NO
13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO
14. Did all bottle labels agree with custody papers? .... YES NO See reverse side.
15. Were correct containers used for the tests indicated? .... YES NO
16. Were correct preservatives added to samples? .... YES NO
17. Was a sufficient amount of sample sent for tests indicated? .... YES NO
18. Were bubbles absent in VOA samples? If NO, list by QA#: N/A ~~YES NO~~
19. Was the shipment accepted? .... YES NO
20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO
21. Who was called ? ______ By whom ? ______ (date)______

B18

* One large block of ice in cooler in a one layer plastic bag. — not double bagged. 1/2" water in bottom of cooler.

* All QA and QC + TOC samples: the depth number was added to the sample ID so that the the ID differentiated the particular samples.

* Sample 900216-0043 (Composite Barrel Sample) has no analysis on bottle label. The Analysis "TOC" is exed on the C-OC.
The sample is labelled as a HOLD at MRD lab.

B 5

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Airport

SAMPLERS: *(Signature)* P. Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC	REMARKS
PGA-8	2-16-90	[illegible]		X	PGA-SB-008-05/VOC	2X	X		2-4oz jar, soil, fld scr: .3ppm
		10:12		X	PGA-SB-008-10/VOC	2X	X		" " " " " =1.2ppm
		"	X		PGA-SB-008/TOC	1X		X	1-8 oz jar soil, fld scr =1.2ppm
		10:23		X	PGA-SB-008-15/VOC	2X	X		2-4oz jar, soil, fld scr = 1.0ppm
		10:32		X	PGA-SB-008-20-VOC	2X	X		" " " " " =1.8ppm
		"		X	PGA-SB-008-QC/VOC	2X	X		" " " " " =1.8ppm
		10:40		X	PGA-SB-008-25/VOC	2X	X		" " " " " = 1.2ppm
		"		X	PGA-SB-008-QA/VOC	2X	X		" " " " " = 1.2ppm
		11:45		X	PGA-SB-008-30/VOC	2X	X		" " " " " = 3.0 ppm
		"	X		PGA-SB-008/TOC	1X		X	1-8 oz jar-soil, field scr =3.0ppm
		"	X		PGA-SB-008-QA/TOC	1X		X	" " " " " " =3.0ppm
		"	X		PGA-SB-008-QC/TOC	1X		X	" " " " " " =3.0ppm
		11:55		X	PGA-SB-008-35/VOC	2X	X		2-4oz jar-soil, fld scr = .4ppm
		12:05		X	PGA-SB-008-40/VOC	2X	X		" " " " " =2.0ppm
		12:20		X	PGA-SB-008-45/VOC	2X	X		" " " " " =1.0ppm

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
P. Brockman	2-16-90 3:00 pm				

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		Brad B[illegible]	2/17/90 1200	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

0107

B0

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.: PG-A

PROJECT NAME: Phoenix Goodyear Airport

SAMPLERS: (Signature) P. Buckman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PGA-SB	2-16-90	12:30		X	PGA-SB-003-~~55~~ 50/VOC	2X	X						2-4oz jar, soil, fieldscr = 1.0ppm
		12:53		X	PGA-SB-003-55/VOC	2X	X						" " " " = 1.0ppm
		1:00	X		Barrel Composite (Borehole	1X		X					1-8oz jar soil

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
P. Buckman	2-16-90 3:00 pm				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		Brad Bird	2/17/90 1200	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

1323

B21

COOLER RECEIPT FORM

MRD Cooler # ________

PROJECT: Phoenix Goodyear Airport   Date received: 2/17/90

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 2/17/90

by (print) Brad Brink / Conrad L. Herman (sign) Brad Brink / Conrad L Herman

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

   If YES, enter carrier name & air bill number here: Fed Ex 3889713612

2. Were custody seals on outside of cooler? .... YES NO

   If YES, how many & where: 2 - 1 front, 1 back

   If YES, enter the following: seal date: 2-16-90, seal name: Penny Brockman

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO
4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO
5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO
6. Did you sign custody papers in the appropriate place? .... YES NO
7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO
8. If required, was enough ice used? .... regular .... YES NO
9. Have designated person initial here to acknowledge receipt of cooler: RDK (date) 2-17-90

B. LOG-IN PHASE: Date samples were logged-in: 2/20/90

by (print) Brad Brink / Conrad L Herman (sign) Brad Brink / Conrad L Herman

10. Describe type of packing in cooler: peanuts
11. Were all bottles sealed in separate plastic bags? .... YES NO
12. Did all bottles arrive unbroken & were labels in good condition? .... YES NO
13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO
14. Did all bottle labels agree with custody papers? .... YES NO
15. Were correct containers used for the tests indicated? .... YES NO
16. Were correct preservatives added to samples? .... ~~YES NO~~ N/A
17. Was a sufficient amount of sample sent for tests indicated? .... YES NO
18. Were bubbles absent in VOA samples? If NO, list by QA#: ________ ~~YES NO~~ N/A
19. Was the shipment accepted? .... YES NO
20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO
21. Who was called ? ________ By whom ? ________ (date) ________

* QA and QC Dup samples did not contain the depth samples were taken in the Sample ID

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
PGA	Phoenix Goodyear Project

SAMPLERS: *(Signature)* P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG90-7	2-19-90	1405		X	PGA-SB-007-05/VOC	2X	X						2-4oz jar soil, fld scn = .4ppm
		1412		X	PGA-SB-007-10/VOC	2X	X						" " " " .8ppm
			X		PGA-SB-007/TOC	1X		X					1-8oz soil field scrn "
		1418		X	PGA-SB-007-15/VOC	2X	X						2-4oz soil, field scrn = .6ppm
		1428		X	PGA-SB-007-20/VOC	2X	X						" " " " 5.0ppm
		1428		X	PGA-SB-007-QC/VOC	2X	X						" " " " = "
		1440		X	PGA-SB-007-25/VOC	2X	X						" " " " = 5.0ppm
		"		X	PGA-SB-007-QA/VOC	2X	X						" " " " = 5.0ppm
		1450		X	PGA-SB-007-30/VOC	2X	X						" " " " = .6ppm
		"	X	~~X~~	PGA-SB-007-TOC	1X		X					1-8oz jar soil, fld scrn = .6ppm
		"	X		PGA-SB-007-QA/TOC	1X		X					" " " " = .6ppm
		"	X		PGA-SB-007-QC/TOC	1X		X					" " " " = .6ppm
		1510		X	PGA-SB-007-35/VOC	2X	X						2-4oz jar, soil fld scrn = 3.1ppm
		1515		X	PGA-SB-007-40/VOC	2X	X						" " " " = 8.8ppm
		1535		X	PGA-SB-007-45/VOC	2X	X						" " " " = 7.2ppm

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
P Brockman	2-20-90 11:30				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	
		[illegible signature]	2-21-90 10:30		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

341

U.S. ARMY CORPS OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME	NO. OF CONTAINERS	VOC	TOC					REMARKS
PGA	Phoenix Goodyear Project								

SAMPLERS: *(Signature)* P Brockman

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	TOC					REMARKS
PG-90-7	2-20	~~9:10~~			~~SB~~-								
		9:10		X	PGA-SB-007-50 VOC	2X	X						2-4 oz jars, soil, fld scr = .4 ppm
		9:30		X	~~PGA-SB-007-55 VOC~~	~~2X~~	~~X~~						
		9:30	X		Barrel Composite	1X		X					1-8 oz jar soil
					0'-55'								
		9:30		X	PGA-SB-007-55 VOC	2X	X						2-4 oz jar - soil / fld scr =

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
P Brockman	2-20-90 11:30				
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*

Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks
		[illegible signature]	2-21-90 10:30	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

B25

COOLER RECEIPT FORM

MRD Cooler # 120

PROJECT: Phoenix Goodyear Airport Date received: 2-21-90

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS.

A. PRELIMINARY EXAMINATION PHASE: Date cooler was opened: 2-21-90

by (print) Conrad Gorman / DANIEL Sanders (sign) Conrad L Gorman / Daniel Sanders

1. Did cooler come with a shipping slip (air bill, etc.)? .... YES NO

If YES, enter carrier name & air bill number here: Federal Express: 3889713601

2. Were custody seals on outside of cooler? .... YES NO

If YES, how many & where: 2 - one Front one back of lid.

If YES, enter the following: seal date: 2-20-90, seal name: Penney Brockman

3. Were custody seals unbroken and intact at the date and time of arrival? .... YES NO

4. Were custody papers sealed in a plastic bag & taped inside to the lid? .... YES NO

5. Were custody papers filled out properly (ink, signed, etc.)? .... YES NO

6. Did you sign custody papers in the appropriate place? .... YES NO

7. Was project identifiable from custody papers? If YES, enter project name at the top of this form. YES NO

8. If required, was enough ice used? .... regular (block of ice) .... YES NO

9. Have designated person initial here to acknowledge receipt of cooler: RDK (date) 2-21-90

B. LOG-IN PHASE: Date samples were logged-in: 2-21-90

by (print) Conrad L Gorman / Daniel Sanders (sign) Conrad L Gorman / Daniel Sanders

10. Describe type of packing in cooler: Styrofoam worms

11. Were all bottles sealed in separate plastic bags? .... YES NO

12. Did all bottles arrive unbroken & were labels in good condition? .... YES NO

13. Were all bottle labels complete (ID, date, time, signature, preservative, etc.)? .... YES NO

14. Did all bottle labels agree with custody papers? .... YES NO

15. Were correct containers used for the tests indicated? .... YES NO

16. Were correct preservatives added to samples? .... N/A .... ~~YES NO~~

17. Was a sufficient amount of sample sent for tests indicated? .... YES NO

18. Were bubbles absent in VOA samples? If NO, list by QA#: N/A ~~YES NO~~

19. Was the shipment accepted? .... YES NO

20. Was the project manager called and status discussed? If YES, give details on the back of this form. YES NO

21. Who was called ? ____________ By whom ? ____________ (date) ____________

B26

5. A) The signature on the C-OC "relinquished by" block is P Brockman — Not a full signature. (Penney Brockman)

B) The second page of the C-OC has entries placed on it by use of a pencil — Not an ink pen.

14. Sample 900221-023 (PGA SB-007-55) has incorrect date on the bottle sample label. The time on this bottle sample label is "10:18" and on the C-OC it is 9:30.

14. Sample 900221-024 (Barrel Composite) has an entry of TOC for analysis on the C-O-C. This sample is a HOLD.

5. The second page of the C-OC not of good legible handwriting for some entries.

Note!

One large block of ice in a plastic bag placed in bottom of cooler: 1/4" water on bottom of cooler.

PART C

QUALITY CONTROL TEST RESULTS

C1

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport
Date Sample Taken: 04 Feb 90 **Customer Sample No:** PGA-SS-011
Date Sample Received: 06 Feb 90 **Lab Sample No:** 900207-001
Sample Description: Soil
Sample Container Used: 1-8 oz glass

Sample analyzed for: Metals
Extraction/Analysis Method: EPA Method 3050/6010; EPA 7470 for Mercury; EPA 7061 for Arsenic; EPA 7741 for Selenium
Date Analyzed: 09 Mar 90
Analyst: T. Shannon

RESULTS (mg/kg)

Analysis for	Result	Detection Limits
Antimony	BDL	50
Arsenic	3.3	0.2
Beryllium	3	2
Cadmium	BDL	3
Chromium	29	5
Copper	20	5
Lead	11	10
Mercury	BDL	0.05
Nickel	14	5
Silver	BDL	10
Selenium	BDL	0.2
Thallium	BDL	100
Zinc	50	2

BDL: Below Detection Limit
Reported results based on dry weight.

Laboratory Comments:

Approved by: Joseph Solsky Date: 3-21-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport
Date Sample Taken: 04 Feb 90
Customer Sample No: PGA-SS-010
Date Sample Received: 06 Feb 90
Lab Sample No: 900207-002
Sample Description: Soil
Sample Container Used: 1-8 oz glass

Sample analyzed for: Metals
Extraction/Analysis Method: EPA Method 3050/6010; EPA 7470 for Mercury; EPA 7061 for Arsenic; EPA 7741 for Selenium
Date Analyzed: 09 Mar 90
Analyst: T. Shannon

RESULTS (mg/kg)

Analysis for	Result	Detection Limits
Antimony	BDL	50
Arsenic	3.3	0.2
Beryllium	BDL	2
Cadmium	BDL	3
Chromium	44	5
Copper	51	5
Lead	21	10
Mercury	BDL	0.05
Nickel	14	5
Silver	BDL	10
Selenium	BDL	0.2
Thallium	BDL	100
Zinc	53	2

BDL: Below Detection Limit
Reported results based on dry weight.

Laboratory Comments:

Approved by: Joseph Solsky   Date: 3-21-90

C3

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport
Date Sample Taken: 04 Feb 90
Date Sample Received: 06 Feb 90
Sample Description: Soil
Sample Container Used: 1-8 oz glass

Customer Sample No: PGA-SS-010-QC
Lab Sample No: 900207-004

Sample analyzed for: Metals
Extraction/Analysis Method: EPA Method 3050/6010; EPA 7470 for Mercury; EPA 7061 for Arsenic; EPA 7741 for Selenium
Date Analyzed: 09 Mar 90
Analyst: T. Shannon

RESULTS (mg/kg)

Analysis for	Result	Detection Limits
Antimony	BDL	50
Arsenic	3.8	0.2
Beryllium	BDL	2
Cadmium	BDL	3
Chromium	43	5
Copper	44	5
Lead	15	10
Mercury	0.06	0.05
Nickel	14	5
Silver	BDL	10
Selenium	BDL	0.2
Thallium	BDL	100
Zinc	54	2

BDL: Below Detection Limit
Reported results based on dry weight.

Laboratory Comments:

Approved by: Joseph Solsky   Date: 3-21-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport
Date Sample Taken: 04 Feb 90 **Customer Sample No:** PGA-SS-009
Date Sample Received: 06 Feb 90 **Lab Sample No:** 900207-006
Sample Description: Soil
Sample Container Used: 1-8 oz glass

Sample analyzed for: Metals
Extraction/Analysis Method: EPA Method 3050/6010; EPA 7470 for Mercury; EPA 7061 for Arsenic; EPA 7741 for Selenium
Date Analyzed: 09 Mar 90
Analyst: T. Shannon

RESULTS (mg/kg)

Analysis for	Result	Detection Limits
Antimony	BDL	50
Arsenic	3.1	0.2
Beryllium	BDL	2
Cadmium	BDL	3
Chromium	17	5
Copper	13	5
Lead	BDL	10
Mercury	BDL	0.05
Nickel	10	5
Silver	BDL	10
Selenium	BDL	0.2
Thallium	BDL	100
Zinc	32	2

BDL: Below Detection Limit
Reported results based on dry weight.

Laboratory Comments:

Approved by: Joseph Solsky Date: 3-21-90

C5

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90
Date Sample Received: 09 Feb 90
Date Analyzed: 09 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-002-05
Lab Sample No: 900209-001
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0101004

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	ug/kg	1000
2. Bromomethane	BDL	ug/kg	1000
3. Vinyl Chloride	BDL	ug/kg	1000
4. Chloroethane	BDL	ug/kg	1000
5. Dichloromethane	BDL	ug/kg	500
6. Acetone	BDL	ug/kg	5000
7. Carbon Disulfide	BDL	ug/kg	500
8. Trichlorofluoromethane	BDL	ug/kg	500
9. 1,1-Dichloroethene	BDL	ug/kg	500
10. 1,1-Dichloroethane	BDL	ug/kg	500
11. 1,2-Dichloroethene(total)	BDL	ug/kg	500
12. Chloroform	BDL	ug/kg	500
13. 2-Butanone	BDL	ug/kg	5000
14. 1,2-Dichloroethane	BDL	ug/kg	500
15. 1,1,1-Trichloroethane	BDL	ug/kg	500
16. Carbon Tetrachloride	BDL	ug/kg	500
17. Vinyl Acetate	BDL	ug/kg	1000
18. Dichlorobromomethane	BDL	ug/kg	500
19. 1,2-Dichloropropane	BDL	ug/kg	500
20. cis-1,3-Dichloropropene	BDL	ug/kg	500
21. Trichloroethene	BDL	ug/kg	200
22. Dibromochloromethane	BDL	ug/kg	500
23. Benzene	BDL	ug/kg	500
24. 1,1,2-Trichloroethane	BDL	ug/kg	500
25. trans-1,3-Dichloropropene	BDL	ug/kg	500
26. 2-Chloroethylvinylether	BDL	ug/kg	1000
27. Bromoform	BDL	ug/kg	500
28. 4-Methyl-2-Pentanone	BDL	ug/kg	1000
29. 2-Hexanone	BDL	ug/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	ug/kg	500
31. Tetrachloroethene	BDL	ug/kg	500
32. Toluene	BDL	ug/kg	500
33. Chlorobenzene	BDL	ug/kg	500
34. Ethylbenzene	BDL	ug/kg	500
35. Styrene	BDL	ug/kg	500
36. Xylenes(Total)	BDL	ug/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(ug/kg)
37. 1,2-Dichloroethane-d_4	93	70-121	6200
38. Toluene-d_8	102	81-117	6200
39. P-Bromofluorobenzene	103	74-121	6200

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

C6

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 **Customer Sample No:** PGA-SB-002-10
Date Sample Received: 09 Feb 90 **Lab Sample No:** 900209-002
Date Analyzed: 09 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0401007

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	94	70-121	6200
38. Toluene-d_8	102	81-117	6200
39. P-Bromofluorobenzene	102	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C7

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 **Customer Sample No:** PGA-SB-002-15
Date Sample Received: 09 Feb 90 **Lab Sample No:** 900209-003
Date Analyzed: 09 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0501008

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	86	70-121	6200
38. Toluene-d_8	99	81-117	6200
39. P-Bromofluorobenzene	103	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C8

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 **Customer Sample No:** PGA-SB-002-20
Date Sample Received: 09 Feb 90 **Lab Sample No:** 900209-004
Date Analyzed: 09 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Light Brown Dry Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0601009

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	90	70-121	6200
38. Toluene-d_8	103	81-117	6200
39. P-Bromofluorobenzene	104	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C9

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: Phoenix Goodyear Airport - Dr. Joe Solsky

WORK ORDER NO.: 655 PROJECT NO.: 11212

ANALYZED: 03-19-90 METHOD NO.: EPA 415.1

ANALYSIS PERFORMED: TOC Analysis

ANALYST: G. Luna & J. Tobler LAB NOTEBOOK NO.: 135

SAMPLE NOS. EHRT NO.	CUSTOMER NO.	STATION LOCATION	RESULTS (ug/grams)	LAB NOTEBOOK PAGE NO.
23076	900209-005	PGA-SB-002-20	21,970	5
23077	900209-011	PGA-SB-002-45	< 250	5
23078	900209-013	PGA-SB-002-45-QC	< 250	5
23080	900210-003	PGA-SB-003-10	9,575	5
23082	900210-010	PGA-SB-003-30	< 250	5
23083	900210-011	PGA-SB-003-30-QC	257	5

QUALITY CONTROL OFFICER: [signature]

DATE: 3/29/90

C 10

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 **Customer Sample No:** PGA-SB-002-25
Date Sample Received: 09 Feb 90 **Lab Sample No:** 900209-006
Date Analyzed: 09 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0701010

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	91	70-121	6200
38. Toluene-d_8	112	81-117	6200
39. P-Bromofluorobenzene	96	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C11

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 — **Customer Sample No:** PGA-SB-002-30
Date Sample Received: 09 Feb 90 — **Lab Sample No:** 900209-007
Date Analyzed: 09 Feb 90 — **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0801011

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	94	70-121	6200
38. Toluene-d_8	104	81-117	6200
39. P-Bromofluorobenzene	107	74-121	6200

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C12

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 **Customer Sample No:** PGA-SB-002-35
Date Sample Received: 09 Feb 90 **Lab Sample No:** 900209-008
Date Analyzed: 09 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0901012

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	101	70-121	6200
38. Toluene-d_8	103	81-117	6200
39. P-Bromofluorobenzene	105	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 **Customer Sample No:** PGA-SB-002-40
Date Sample Received: 09 Feb 90 **Lab Sample No:** 900209-009
Date Analyzed: 09 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Wet Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA1001013

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	104	70-121	6200
38. Toluene-d_8	105	81-117	6200
39. P-Bromofluorobenzene	108	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C 14

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 — **Customer Sample No:** PGA-SB-002-45
Date Sample Received: 09 Feb 90 — **Lab Sample No:** 900209-010
Date Analyzed: 13 Feb 90 — **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0101045

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	99	70-121	6200
38. Toluene-d_8	98	81-117	6200
39. P-Bromofluorobenzene	101	74-121	6200

BDL: Below Detection Limit — **Approved By:** Joseph Solsky — **Date:** 3-17-90

C15

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90
Date Sample Received: 09 Feb 90
Date Analyzed: 10 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-002-50
Lab Sample No: 900209-014
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0401018

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	121	70-121	6200
38. Toluene-d_8	106	81-117	6200
39. P-Bromofluorobenzene	103	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C16

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 08 Feb 90 **Customer Sample No:** PGA-SB-002-55
Date Sample Received: 09 Feb 90 **Lab Sample No:** 900209-015
Date Analyzed: 12 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Wet Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101027

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	103	70-121	6200
38. Toluene-d_8	93	81-117	6200
39. P-Bromofluorobenzene	92	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C17

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90 **Customer Sample No:** PGA-SB-003-05
Date Sample Received: 10 Feb 90 **Lab Sample No:** 900210-001
Date Analyzed: 12 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101028

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	92	70-121	6200
38. Toluene-d_8	91	81-117	6200
39. P-Bromofluorobenzene	90	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solahy **Date:** 3-17-90

C18

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90
Date Sample Received: 10 Feb 90
Date Analyzed: 12 Feb 90
Sample Description: Dry Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-003-10
Lab Sample No: 900210-002
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0201029

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	97	70-121	6200
38. Toluene-d_8	94	81-117	6200
39. P-Bromofluorobenzene	95	74-121	6200

BDL: Below Detection Limit   **Approved By:** Joseph Solsky   **Date:** 3-12-90

C19

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90
Date Sample Received: 10 Feb 90
Date Analyzed: 12 Feb 90
Sample Description: Dry Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-003-15
Lab Sample No: 900210-004
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0301030

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	104	70-121	6200
38. Toluene-d_8	100	81-117	6200
39. P-Bromofluorobenzene	99	74-121	6200

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C20

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90 **Customer Sample No:** PGA-SB-003-20
Date Sample Received: 10 Feb 90 **Lab Sample No:** 900210-005
Date Analyzed: 12 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0601033

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	86	70-121	6200
38. Toluene-d_8	98	81-117	6200
39. P-Bromofluorobenzene	94	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C21

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90
Date Sample Received: 10 Feb 90
Date Analyzed: 12 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-003-20-QC
Lab Sample No: 900210-006
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0701034

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	95	70-121	6200
38. Toluene-d_8	98	81-117	6200
39. P-Bromofluorobenzene	94	74-121	6200

BDL: Below Detection Limit   **Approved By:** Joseph Solsky   **Date:** 3-12-90

C22

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90
Customer Sample No: PGA-SB-003-25
Date Sample Received: 10 Feb 90
Lab Sample No: 900210-007
Date Analyzed: 12 Feb 90
Container Used: 4-oz. glass
Sample Description: Dry Brown Sand
Analyst: David E. Splichal
EPA Method: SW-846, Method 8240 (Medium)
GC/MS File ID: VOA0401031

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	86	70-121	6200
38. Toluene-d_8	96	81-117	6200
39. P-Bromofluorobenzene	93	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C23

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90 **Customer Sample No:** PGA-SB-003-30
Date Sample Received: 10 Feb 90 **Lab Sample No:** 900210-009
Date Analyzed: 12 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0801035

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	92	70-121	6200
38. Toluene-d_8	95	81-117	6200
39. P-Bromofluorobenzene	90	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C 24

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90 **Customer Sample No:** PGA-SB-003-35
Date Sample Received: 10 Feb 90 **Lab Sample No:** 900210-013
Date Analyzed: 12 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0901036

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	95	70-121	6200
38. Toluene-d_8	97	81-117	6200
39. P-Bromofluorobenzene	96	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90 **Customer Sample No:** PGA-SB-003-40
Date Sample Received: 10 Feb 90 **Lab Sample No:** 900210-014
Date Analyzed: 12 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA1001037

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	93	70-121	6200
38. Toluene-d_8	101	81-117	6200
39. P-Bromofluorobenzene	98	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C26

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90
Date Sample Received: 10 Feb 90
Date Analyzed: 13 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-003-45
Lab Sample No: 900210-015
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0101040

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	97	70-121	6200
38. Toluene-d_8	97	81-117	6200
39. P-Bromofluorobenzene	98	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C27

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90 **Customer Sample No:** PGA-SB-003-50
Date Sample Received: 10 Feb 90 **Lab Sample No:** 900210-016
Date Analyzed: 13 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101041

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	97	70-121	6200
38. Toluene-d_8	96	81-117	6200
39. P-Bromofluorobenzene	98	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C 28

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 09 Feb 90 **Customer Sample No:** PGA-SB-003-55
Date Sample Received: 10 Feb 90 **Lab Sample No:** 900210-017
Date Analyzed: 13 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101042

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	93	70-121	6200
38. Toluene-d_8	95	81-117	6200
39. P-Bromofluorobenzene	99	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C29

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 14 Feb 90
Sample Description: Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-05
Lab Sample No: 900214-022
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0201048

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	104	70-121	3100
38. Toluene-d_8	100	81-117	3100
39. P-Bromofluorobenzene	102	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C30

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90 **Customer Sample No:** PGA-SB-004-10
Date Sample Received: 14 Feb 90 **Lab Sample No:** 900214-023
Date Analyzed: 14 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Clay and Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0301049

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	102	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	105	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C31

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: Phoenix Goodyear Airport - Dr. Joe Solsky

WORK ORDER NO.: 663 PROJECT NO.: 11224

ANALYZED: 03-19-90 METHOD NO.: EPA 415.1

ANALYSIS PERFORMED: TOC Analysis

ANALYST: G. Luna & J. Tobler LAB NOTEBOOK NO.: 135

SAMPLE NOS. EHRT NO.	CUSTOMER NO.	STATION LOCATION	RESULTS (ug/grams)	LAB NOTEBOOK PAGE NO.
23143	900214-024	PGA-SB-004-10	15,784	5
23145	900214-031	PGA-SB-004-30	308	5
23146	900214-033	PGA-SB-004-30-QC	< 250	5

QUALITY CONTROL OFFICER: [signature]

DATE: 4/4/90

C32

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90 — **Customer Sample No:** PGA-SB-004-15
Date Sample Received: 14 Feb 90 — **Lab Sample No:** 900214-025
Date Analyzed: 14 Feb 90 (%solids = 67.8) — **Container Used:** 4-oz. glass
Sample Description: Moist Clay and Sand — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0401050

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	500	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	91	70-121	3100
38. Toluene-d_8	92	81-117	3100
39. P-Bromofluorobenzene	95	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C33

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Customer Sample No: PGA-SB-004-20
Date Sample Received: 14 Feb 90
Lab Sample No: 900214-026
Date Analyzed: 14 Feb 90 (%solids = 87.8)
Container Used: 4-oz. glass
Sample Description: Grey Clay
Analyst: David E. Splichal
EPA Method: SW-846, Method 8240 (Medium)
GC/MS File ID: VOA0501051

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	63 *	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	112	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	102	74-121	3100

BDL: Below Detection Limit

C 34

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90 **Customer Sample No:** PGA-SB-004-20
Date Sample Received: 14 Feb 90 **Lab Sample No:** 900214-026
Date Analyzed: 14 Feb 90 (%solids = 87.8) **Container Used:** 4-oz. glass
Sample Description: Grey Clay **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0501051

Comments: *: Below the lowest practical quantitation limit of 200-μg/kg. This value reported is an "estimation" and is to be used only to show that Trichloroethene is present, (accurate quantitation is not possible due to wide variance in peak areas close to the detection limit).

Approved By: Joseph Solsky **Date:** 3-17-90

C35

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 14 Feb 90 (%solids = 86.2)
Sample Description: Grey Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-20-QC
Lab Sample No: 900214-027
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0601052

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	110 *	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	111	70-121	3100
38. Toluene-d_8	101	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit

C36

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 14 Feb 90 (%solids = 86.2)
Sample Description: Grey Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-20-QC
Lab Sample No: 900214-027
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0601052

Comments: *: Below the lowest practical quantitation limit of 200-μg/kg. This value reported is an "estimation" and is to be used only to show that Trichloroethene is present, (accurate quantitation is not possible due to wide variance in peak areas close to the detection limit).

Approved By: Joseph Solsky **Date:** 3-17-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 14 & 15 Feb 90
Sample Description: Red Clay and Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-25
Lab Sample No: 900214-028
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0701053/VOA0101063

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	5100 +	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	105	70-121	3100
38. Toluene-d_8	101	81-117	3100
39. P-Bromofluorobenzene	102	74-121	3100

BDL: Below Detection Limit

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 14 & Feb 90
Sample Description: Red Clay and Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-25
Lab Sample No: 900214-028
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0701053/VOA0101063

Comments: +: A laboratory duplicate was analyzed for this sample. The value for Trichloroethene from this second run (second bottle, new prep) was 8700-μg/kg.

% solids = 75.9%

Approved By: Joseph Solsky **Date:** 3-17-90

C39

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90 **Customer Sample No:** PGA-SB-004-30
Date Sample Received: 14 Feb 90 **Lab Sample No:** 900214-030
Date Analyzed: 14 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Red Clay and Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0801054

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	108	70-121	3100
38. Toluene-d_8	100	81-117	3100
39. P-Bromofluorobenzene	102	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C40

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 14 Feb 90
Sample Description: Moist Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-35
Lab Sample No: 900214-034
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA1001056

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	120	70-121	3100
38. Toluene-d_8	100	81-117	3100
39. P-Bromofluorobenzene	102	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

C41

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 15 Feb 90
Sample Description: Moist Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-40
Lab Sample No: 900214-035
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0101059

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene (total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes (Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range (%Rec)	Amount of Spike (µg/kg)
37. 1,2-Dichloroethane-d_4	98	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	95	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

C42

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 15 Feb 90
Sample Description: Moist Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-45
Lab Sample No: 900214-036
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0101060

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	89	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	94	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C43

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90
Date Sample Received: 14 Feb 90
Date Analyzed: 15 Feb 90
Sample Description: Moist Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-004-50
Lab Sample No: 900214-037
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0101061

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	88	70-121	3100
38. Toluene-d_8	100	81-117	3100
39. P-Bromofluorobenzene	92	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90 **Customer Sample No:** PGA-SB-004-55
Date Sample Received: 14 Feb 90 **Lab Sample No:** 900214-038
Date Analyzed: 15 & 21 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand and Rocks **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101062

	Analyte	Result	Units	Detection Limits
1.	Chloromethane	BDL	µg/kg	1000
2.	Bromomethane	BDL	µg/kg	1000
3.	Vinyl Chloride	BDL	µg/kg	1000
4.	Chloroethane	BDL	µg/kg	1000
5.	Dichloromethane	BDL	µg/kg	500
6.	Acetone	BDL	µg/kg	5000
7.	Carbon Disulfide	BDL	µg/kg	500
8.	Trichlorofluoromethane	BDL	µg/kg	500
9.	1,1-Dichloroethene	BDL	µg/kg	500
10.	1,1-Dichloroethane	BDL	µg/kg	500
11.	1,2-Dichloroethene(total)	BDL	µg/kg	500
12.	Chloroform	BDL	µg/kg	500
13.	2-Butanone	BDL	µg/kg	5000
14.	1,2-Dichloroethane	BDL	µg/kg	500
15.	1,1,1-Trichloroethane	BDL	µg/kg	500
16.	Carbon Tetrachloride	BDL	µg/kg	500
17.	Vinyl Acetate	BDL	µg/kg	1000
18.	Dichlorobromomethane	BDL	µg/kg	500
19.	1,2-Dichloropropane	BDL	µg/kg	500
20.	cis-1,3-Dichloropropene	BDL	µg/kg	500
21.	Trichloroethene	600 *	µg/kg	200
22.	Dibromochloromethane	BDL	µg/kg	500
23.	Benzene	BDL	µg/kg	500
24.	1,1,2-Trichloroethane	BDL	µg/kg	500
25.	trans-1,3-Dichloropropene	BDL	µg/kg	500
26.	2-Chloroethylvinylether	BDL	µg/kg	1000
27.	Bromoform	BDL	µg/kg	500
28.	4-Methyl-2-Pentanone	BDL	µg/kg	1000
29.	2-Hexanone	BDL	µg/kg	1000
30.	1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31.	Tetrachloroethene	BDL	µg/kg	500
32.	Toluene	BDL	µg/kg	500
33.	Chlorobenzene	BDL	µg/kg	500
34.	Ethylbenzene	BDL	µg/kg	500
35.	Styrene	BDL	µg/kg	500
36.	Xylenes(Total)	BDL	µg/kg	500

	Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37.	1,2-Dichloroethane-d_4	95	70-121	3100
38.	Toluene-d_8	98	81-117	3100
39.	P-Bromofluorobenzene	89	74-121	3100

BDL: Below Detection Limit

C45

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 13 Feb 90 **Customer Sample No:** PGA-SB-004-55
Date Sample Received: 14 Feb 90 **Lab Sample No:** 900214-038
Date Analyzed: 15 & 21 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand and Rocks **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101062

Comments: *: A laboratory duplicate was analyzed for this sample. The value for Trichloroethene from this second run (second bottle, new prep) was 110-µg/kg. However, this second value is below the lowest practical quantitation limit of 200-µg/kg. This value is an "estimation" and is to be used only to show that Trichloroethene is present, (accurate quantitation is not possible due to wide variance in peak areas close to the detection limit).

% solids = 83.7%

Approved By: Joseph Solsky **Date:** 3-12-90

C46

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90
Date Sample Received: 16 Feb 90
Date Analyzed: 16 Feb 90
Sample Description: Moist Sand and Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-005-05
Lab Sample No: 900216-026
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0101067

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	84	70-121	3100
38. Toluene-d_8	107	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C47

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90 **Customer Sample No:** PGA-SB-005-10
Date Sample Received: 16 Feb 90 **Lab Sample No:** 900216-027
Date Analyzed: 16 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101070

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	92	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	100	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solaky **Date:** 3-17-90

C48

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: Phoenix Goodyear Airport - Dr. Joe Solsky

WORK ORDER NO.: 669 PROJECT NO.: 11240

ANALYZED: 03-19-90 METHOD NO.: EPA 415.1

ANALYSIS PERFORMED: TOC Analysis

ANALYST: G. Luna & J. Tobler LAB NOTEBOOK NO.: 135

SAMPLE NOS. EHRT NO.	CUSTOMER NO.	STATION LOCATION	RESULTS (ug/grams)	LAB NOTEBOOK PAGE NO.
23193	900216-028	PGA-SB-005-10	640	5
23195	900216-035	PGA-SB-005-30	< 250	5
23196	900216-037	PGA-SB-005-30-QC	< 250	5
23197	900220-006	PGA-SB-008-10	26,121	5
23199	900220-013	PGA-SB-008-30	< 250	5
23200	900220-015	PGA-SB-008-30-QC	272	5

QUALITY CONTROL OFFICER: Ivone Rich

DATE: 4/4/90

C49

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90
Date Sample Received: 16 Feb 90
Date Analyzed: 16 Feb 90
Sample Description: Moist Sand and Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-005-15
Lab Sample No: 900216-029
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0401075

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene (total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes (Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range (%Rec)	Amount of Spike (μg/kg)
37. 1,2-Dichloroethane-d_4	101	70-121	3100
38. Toluene-d_8	110	81-117	3100
39. P-Bromofluorobenzene	112	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solchy **Date:** 3-17-90

C50

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90 **Customer Sample No:** PGA-SB-005-20
Date Sample Received: 16 Feb 90 **Lab Sample No:** 900216-030
Date Analyzed: 16 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand and Clay **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0701078

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	98	70-121	3100
38. Toluene-d_8	101	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C 51

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90
Date Sample Received: 16 Feb 90
Date Analyzed: 16 Feb 90
Sample Description: Moist Sand and Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-005-20-QC
Lab Sample No: 900216-031
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0801079

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	101	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	107	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C 52

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90 — **Customer Sample No:** PGA-SB-005-25
Date Sample Received: 16 Feb 90 — **Lab Sample No:** 900216-032
Date Analyzed: 16 Feb 90 — **Container Used:** 4-oz. glass
Sample Description: Moist Sand and Clay — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0101069

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	92	70-121	3100
38. Toluene-d_8	101	81-117	3100
39. P-Bromofluorobenzene	100	74-121	3100

BDL: Below Detection Limit — **Approved By:** Joseph Solsky — **Date:** 3-17-90

C53

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90 **Customer Sample No:** PGA-SB-005-30
Date Sample Received: 16 Feb 90 **Lab Sample No:** 900216-034
Date Analyzed: 16 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0301074

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	100	70-121	3100
38. Toluene-d_8	116	81-117	3100
39. P-Bromofluorobenzene	100	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solchy **Date:** 3-12-90

C54

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90
Date Sample Received: 16 Feb 90
Date Analyzed: 16 Feb 90
Sample Description: Moist Sand and Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-005-35
Lab Sample No: 900216-038
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0901080

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	105	70-121	3100
38. Toluene-d_8	105	81-117	3100
39. P-Bromofluorobenzene	110	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90 **Customer Sample No:** PGA-SB-005-40
Date Sample Received: 16 Feb 90 **Lab Sample No:** 900216-039
Date Analyzed: 16 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0201073

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	102	70-121	3100
38. Toluene-d_8	105	81-117	3100
39. P-Bromofluorobenzene	108	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C56

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90
Date Sample Received: 16 Feb 90
Date Analyzed: 19 Feb 90
Sample Description: Moist Sand, Rocks, Clay
EPA Method: SW-846, Method 8240 (Medium)

Customer Sample No: PGA-SB-005-45
Lab Sample No: 900216-040
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0201084

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	89	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	95	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C 57

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90
Date Sample Received: 16 Feb 90
Date Analyzed: 16 Feb 90
Sample Description: Moist Sand and Rocks
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-005-50
Lab Sample No: 900216-041
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA1001081

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	106	70-121	3100
38. Toluene-d_8	106	81-117	3100
39. P-Bromofluorobenzene	116	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

C 58

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90
Customer Sample No: PGA-SB-005-55
Date Sample Received: 16 Feb 90
Lab Sample No: 900216-042
Date Analyzed: 16 & 23 Feb 90
Container Used: 4-oz. glass
Sample Description: Wet Sand and Rocks
Analyst: David E. Splichal
EPA Method: SW-846, Method 8240 (Medium)
GC/MS File ID: VOA0101068

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	81 *	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	95	70-121	3100
38. Toluene-d_8	98	81-117	3100
39. P-Bromofluorobenzene	89	74-121	3100

BDL: Below Detection Limit

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 15 Feb 90 **Customer Sample No:** PGA-SB-005-55
Date Sample Received: 16 Feb 90 **Lab Sample No:** 900216-042
Date Analyzed: 16 & 23 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Wet Sand and Rocks **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101068

Comments: *: Various laboratory duplicates were analyzed for this sample. The first methanol sample extract was analyzed twice yielding results for Trichloroethene of 81 and 110-µg/kg. The second bottle was also used for sample extraction, and the methanol extract was also analyzed twice yielding results for TCE of 85 and 74-µg/kg. All values reported are below the lowest practical quantitation limit of 200-µg/kg. These values are "estimations" and are to be used only to show that Trichloroethene is present, (accurate quantitation is not possible due to wide variance in peak areas close to the detection limit).

% solids = 83.5%

Approved By: Joseph Solsky **Date:** 3-12-90

C60

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90
Date Sample Received: 17 Feb 90
Date Analyzed: 19 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-008-05
Lab Sample No: 900220-004
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0301085

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	94	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	98	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C61

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90
Date Sample Received: 17 Feb 90
Date Analyzed: 19 Feb 90
Sample Description: Moist Brown Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-008-10
Lab Sample No: 900220-005
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0401086

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	98	70-121	3100
38. Toluene-d_8	104	81-117	3100
39. P-Bromofluorobenzene	99	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Kolsky **Date:** 3-12-90

C62

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90 — Customer Sample No: PGA-SB-008-15
Date Sample Received: 17 Feb 90 — Lab Sample No: 900220-007
Date Analyzed: 19 Feb 90 — Container Used: 4-oz. glass
Sample Description: Dry Brown Sand — Analyst: David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — GC/MS File ID: VOA0501087

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	106	70-121	3100
38. Toluene-d_8	107	81-117	3100
39. P-Bromofluorobenzene	103	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky Date: 3-12-90

C63

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90 **Customer Sample No:** PGA-SB-008-20
Date Sample Received: 17 Feb 90 **Lab Sample No:** 900220-008
Date Analyzed: 19 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0601088

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	98	70-121	3100
38. Toluene-d_8	112	81-117	3100
39. P-Bromofluorobenzene	106	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C64

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90
Date Sample Received: 17 Feb 90
Date Analyzed: 19 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-008-20-QC
Lab Sample No: 900220-009
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0701089

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	101	70-121	3100
38. Toluene-d_8	108	81-117	3100
39. P-Bromofluorobenzene	106	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C65

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90
Date Sample Received: 17 Feb 90
Date Analyzed: 19 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-008-25
Lab Sample No: 900220-010
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0801090

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	108	70-121	3100
38. Toluene-d_8	109	81-117	3100
39. P-Bromofluorobenzene	106	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C66

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90
Date Sample Received: 17 Feb 90
Date Analyzed: 19 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-008-30
Lab Sample No: 900220-012
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0901091

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	96	70-121	3100
38. Toluene-d_8	111	81-117	3100
39. P-Bromofluorobenzene	96	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C67

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90 **Customer Sample No:** PGA-SB-008-35
Date Sample Received: 17 Feb 90 **Lab Sample No:** 900220-016
Date Analyzed: 19 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Brown Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA1001092

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	107	70-121	3100
38. Toluene-d_8	113	81-117	3100
39. P-Bromofluorobenzene	111	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C68

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90
Date Sample Received: 17 Feb 90
Date Analyzed: 21 Feb 90
Sample Description: Dry Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-008-40
Lab Sample No: 900220-017
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0201095

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	97	70-121	3100
38. Toluene-d_8	105	81-117	3100
39. P-Bromofluorobenzene	101	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

C69

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90 **Customer Sample No:** PGA-SB-008-45
Date Sample Received: 17 Feb 90 **Lab Sample No:** 900220-018
Date Analyzed: 21 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand, Rocks **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0301096

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	89	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	99	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C70

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90 **Customer Sample No:** PGA-SB-008-50
Date Sample Received: 17 Feb 90 **Lab Sample No:** 900220-019
Date Analyzed: 21 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Wet Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0401097

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	99	70-121	3100
38. Toluene-d_8	110	81-117	3100
39. P-Bromofluorobenzene	103	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C 71

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 16 Feb 90 — **Customer Sample No:** PGA-SB-008-55
Date Sample Received: 17 Feb 90 — **Lab Sample No:** 900220-020
Date Analyzed: 21 Feb 90 — **Container Used:** 4-oz. glass
Sample Description: Wet Sand with Rocks — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0501098

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	103	70-121	3100
38. Toluene-d_8	101	81-117	3100
39. P-Bromofluorobenzene	96	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C72

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90
Date Sample Received: 21 Feb 90
Date Analyzed: 21 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-007-05
Lab Sample No: 900221-007
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0701100

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	99	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	102	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

C73

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90
Date Sample Received: 21 Feb 90
Date Analyzed: 21 Feb 90
Sample Description: Moist Brown Sand
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-007-10
Lab Sample No: 900221-008
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA1001103

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	104	70-121	3100
38. Toluene-d_8	115	81-117	3100
39. P-Bromofluorobenzene	102	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Kolisky **Date:** 3-12-90

C74

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
RESULT SHEET

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS

SAMPLE SOURCE: Phoenix Goodyear Airport - Dr. Joe Solsky

WORK ORDER NO.: 675 PROJECT NO.: 11249

ANALYZED: 03-19-90 METHOD NO.: EPA 415.1

ANALYSIS PERFORMED: TOC Analysis

ANALYST: G. Luna & J. Tobler LAB NOTEBOOK NO.: 135

SAMPLE NOS. EHRT NO.	CUSTOMER NO.	STATION LOCATION	RESULTS (ug/grams)	LAB NOTEBOOK PAGE NO.
23298	900221-009	PGA-SB-007-10	5,237	5
23300	900221-016	PGA-SB-007-30	278	5
23301	900221-018	PGA-SB-007-30-QC	< 250	5

QUALITY CONTROL OFFICER: Irene Rift

DATE: 4/11/90

C75

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90
Date Sample Received: 21 Feb 90
Date Analyzed: 21 Feb 90
Sample Description: Moist Red Clay
EPA Method: SW-846, Method 8240 (Medium)
Customer Sample No: PGA-SB-007-15
Lab Sample No: 900221-010
Container Used: 4-oz. glass
Analyst: David E. Splichal
GC/MS File ID: VOA0801101

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	98	70-121	3100
38. Toluene-d_8	101	81-117	3100
39. P-Bromofluorobenzene	98	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C76

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90 — **Customer Sample No:** PGA-SB-007-20
Date Sample Received: 21 Feb 90 — **Lab Sample No:** 900221-011
Date Analyzed: 21 Feb 90 — **Container Used:** 4-oz. glass
Sample Description: Moist Red Clay — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0901102

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	104	70-121	3100
38. Toluene-d_8	101	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit — **Approved By:** Joseph Solsky — **Date:** 3-17-90

C77

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90 **Customer Sample No:** PGA-SB-007-20-QC
Date Sample Received: 21 Feb 90 **Lab Sample No:** 900221-012
Date Analyzed: 22 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Red Clay **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0101106

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	91	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solehy **Date:** 3-12-90

C78

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90 **Customer Sample No:** PGA-SB-007-25
Date Sample Received: 21 Feb 90 **Lab Sample No:** 900221-013
Date Analyzed: 22 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Red Clay **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0201107

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	93	70-121	3100
38. Toluene-d_8	110	81-117	3100
39. P-Bromofluorobenzene	93	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90 **Customer Sample No:** PGA-SB-007-30
Date Sample Received: 21 Feb 90 **Lab Sample No:** 900221-015
Date Analyzed: 22 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0301108

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	96	70-121	3100
38. Toluene-d_8	102	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C 80

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90 — **Customer Sample No:** PGA-SB-007-35
Date Sample Received: 21 Feb 90 — **Lab Sample No:** 900221-019
Date Analyzed: 22 Feb 90 — **Container Used:** 4-oz. glass
Sample Description: Moist Sand — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0601111

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	106	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit — **Approved By:** Joseph Solaby — **Date:** 3-12-90

C 81

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90 **Customer Sample No:** PGA-SB-007-40
Date Sample Received: 21 Feb 90 **Lab Sample No:** 900221-020
Date Analyzed: 22 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0701112

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	104	70-121	3100
38. Toluene-d_8	106	81-117	3100
39. P-Bromofluorobenzene	111	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Holsby **Date:** 3-12-90

C82

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 19 Feb 90 — **Customer Sample No:** PGA-SB-007-45
Date Sample Received: 21 Feb 90 — **Lab Sample No:** 900221-021
Date Analyzed: 22 Feb 90 — **Container Used:** 4-oz. glass
Sample Description: Wet Sand with Rocks — **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) — **GC/MS File ID:** VOA0801113

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	100	70-121	3100
38. Toluene-d_8	107	81-117	3100
39. P-Bromofluorobenzene	107	74-121	3100

BDL: Below Detection Limit — **Approved By:** Joseph Solcky — **Date:** 3-12-90

C 83

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 20 Feb 90 **Customer Sample No:** PGA-SB-007-50
Date Sample Received: 21 Feb 90 **Lab Sample No:** 900221-022
Date Analyzed: 22 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Moist Sand with Rocks **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA0901114

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	104	70-121	3100
38. Toluene-d_8	105	81-117	3100
39. P-Bromofluorobenzene	107	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

C84

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Date Sample Taken: 20 Feb 90 **Customer Sample No:** PGA-SB-007-55
Date Sample Received: 21 Feb 90 **Lab Sample No:** 900221-023
Date Analyzed: 22 Feb 90 **Container Used:** 4-oz. glass
Sample Description: Wet Clay, Sand, Rocks **Analyst:** David E. Splichal
EPA Method: SW-846, Method 8240 (Medium) **GC/MS File ID:** VOA1001115

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	99	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	106	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

C85

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
PCB ANALYSIS

CUSTOMER NAME:	U.S. ARMY CORPS OF ENGINEERS - DR. JOE SOLSKY		
SAMPLE SOURCE:	Phoenix Goodyear Airport (SW of Treatment Plant)		
WORK ORDER NO.:	777	PROJECT NO.:	11493
DATE EXTRACTED:	05-08-90	DATE ANALYZED:	05-09-90
SAMPLE TYPE:	Soil Sample	SAMPLE WEIGHT:	10.25
ANALYST:	M. Cooper	PERCENT SOLIDS:	87.00
CUSTOMER SAMPLE NO.:	900207-005	EHRT SAMPLE NO.:	24437
LAB NOTEBOOK NO.:	104, Pg. 83	METHOD NO.:	EPA 8080

	COMPOUNDS	RESULT ug/kg
1.	Aroclor-1016	< 28.03
2.	Aroclor-1221	< 28.03
3.	Aroclor-1232	< 28.03
4.	Aroclor-1242	< 28.03
5.	Aroclor-1248	< 28.03
6.	Aroclor-1254	266.08
7.	Aroclor-1260	< 28.03

Surrogate Recovery - 106.4%

QUALITY CONTROL OFFICER: Dave Rush

DATE: 5/14/90

C86

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

207005

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0777 SAS No.: 11493_ SDG No.: 000000

Matrix (soil/water): SOIL_ Lab Sample ID: 24437_____

Level (low/med): _____ Date Received: 05/08/90

% Solids: _87.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	______191000_	_	_______	P_
7440-36-0	Antimony_	__________1.6_	U	_______	P_
7440-38-2	Arsenic__	_________0.34_	U	_______	F_
7440-39-3	Barium___	______________	_	_______	NR
7440-41-7	Beryllium	_________0.73_	_	_______	P_
7440-43-9	Cadmium__	_________77.9_	_	_______	P_
7440-70-2	Calcium__	______________	_	_______	NR
7440-47-3	Chromium_	__________758_	_	_______	P_
7440-48-4	Cobalt___	______________	_	_______	NR
7440-50-8	Copper___	________18100_	_	_______	P_
7439-89-6	Iron_____	________21800_	_	_______	P_
7439-92-1	Lead_____	_________1370_	_	_______	P_
7439-95-4	Magnesium	______________	_	_______	NR
7439-96-5	Manganese	_________1480_	_	_______	P_
7439-97-6	Mercury__	__________0.1_	_	_______	CV
7440-02-0	Nickel___	__________238_	_	_______	P_
7440-09-7	Potassium	______________	_	_______	NR
7782-49-2	Selenium_	__________1.5_	_	_______	F_
7440-22-4	Silver___	_________11.1_	_	_______	P_
7440-23-5	Sodium___	______________	_	_______	NR
7440-28-0	Thallium_	__________146_	U	_______	P_
7440-62-2	Vanadium_	______________	_	_______	NR
7440-66-6	Zinc_____	_________3630_	_	_______	P_
__________	Cyanide__	______________	_	_______	NR
__________	_________	______________	_	_______	__

Color Before: _________ Clarity Before: ______ Texture: ______

Color After: _________ Clarity After: ______ Artifacts: ___

Comments:

900207-005__SW_OF_TREATMENT_PLANT_________________________
ON_THE_GRAPHITE_FURNACE_THIS_SAMPLE_SHOWED_A_VERY_LARGE_BACKGROUND____
AREA.____

C87

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

214039

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0777 SAS No.: 11493_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 24440_____

Level (low/med): _____ Date Received: 05/08/90

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_		_		NR
7440-38-2	Arsenic__	4.7_	B		F_
7440-39-3	Barium___	270_	_		P_
7440-41-7	Beryllium		_		NR
7440-43-9	Cadmium__	3.6_	U		P_
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	4.7_	U		P_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___		_		NR
7439-89-6	Iron_____		_		NR
7439-92-1	Lead_____	12.7_	U		P_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese		_		NR
7439-97-6	Mercury__	0.1_	U		CV
7440-02-0	Nickel___		_		NR
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	4.7_	U		P_
7440-23-5	Sodium___		_		NR
7440-28-0	Thallium_		_		NR
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____		_		NR
	Cyanide__		_		NR
			_		__

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: ___

Comments:

900214-039__PGA-SB-004-(0-55)
EP_TOXICITY_METALS_ANALYSIS

C88

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

216043

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0777 SAS No.: 11493_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 24441_____

Level (low/med): _____ Date Received: 05/08/90

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_		_		NR
7440-38-2	Arsenic__	4.9_	B		F_
7440-39-3	Barium___	291_	_		P_
7440-41-7	Beryllium		_		NR
7440-43-9	Cadmium__	3.6_	U		P_
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	4.7_	U		P_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___		_		NR
7439-89-6	Iron_____		_		NR
7439-92-1	Lead_____	12.7_	U		P_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese		_		NR
7439-97-6	Mercury__	0.1_	U		CV
7440-02-0	Nickel___		_		NR
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	4.7_	U		P_
7440-23-5	Sodium___		_		NR
7440-28-0	Thallium_		_		NR
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____		_		NR
	Cyanide__		_		NR
			_		__

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: ___

Comments:

900216-043__COMPOSITE_BARREL_SAMPLE
EP_TOXICITY_METALS_ANALYSIS

C 89

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

209017

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194

Lab Code: W88 Case No.: WO777 SAS No.: 11493_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 24438

Level (low/med): Date Received: 05/08/90

% Solids:

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_		_		NR
7440-38-2	Arsenic__	5.4_	B		F_
7440-39-3	Barium___	153_	B		P_
7440-41-7	Beryllium		_		NR
7440-43-9	Cadmium__	3.6_	U		P_
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	4.7_	U		P_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___		_		NR
7439-89-6	Iron_____		_		NR
7439-92-1	Lead_____	12.7_	U		P_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese		_		NR
7439-97-6	Mercury__	0.1_	U		CV
7440-02-0	Nickel___		_		NR
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	4.7_	U		P_
7440-23-5	Sodium___		_		NR
7440-28-0	Thallium_		_		NR
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____		_		NR
	Cyanide__		_		NR
			_		__

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

900209-017__PGA-SB-002_DRUM
EP_TOXICITY_METALS_ANALYSIS

C90

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

210018

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W88___   Case No.: W0777   SAS No.: 11493_   SDG No.: 000000

Matrix (soil/water): WATER   Lab Sample ID: 24439_____

Level (low/med): _____   Date Received: 05/08/90

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_		_		NR
7440-38-2	Arsenic__	5.5_	B		F_
7440-39-3	Barium___	58.3_	B		P_
7440-41-7	Beryllium		_		NR
7440-43-9	Cadmium__	3.6_	U		P_
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	4.7_	U		P_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___		_		NR
7439-89-6	Iron_____		_		NR
7439-92-1	Lead_____	12.7_	U		P_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese		_		NR
7439-97-6	Mercury__	0.1_	U		CV
7440-02-0	Nickel___		_		NR
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	4.7_	U		P_
7440-23-5	Sodium___		_		NR
7440-28-0	Thallium_		_		NR
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____		_		NR
	Cyanide__		_		NR
			_		__

Color Before: _____   Clarity Before: _____   Texture: _____

Color After: _____   Clarity After: _____   Artifacts: ___

Comments:

900210-018__DRUM_COMPOSITE
EP_TOXICITY_METALS_ANALYSIS

C91

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

220021

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0777 SAS No.: 11493_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 24442_____

Level (low/med): _____ Date Received: 05/08/90

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_		_		NR
7440-38-2	Arsenic__	3.9_	B		F_
7440-39-3	Barium___	209_	_		P_
7440-41-7	Beryllium		_		NR
7440-43-9	Cadmium__	3.6_	U		P_
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	4.7_	U		P_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___		_		NR
7439-89-6	Iron_____		_		NR
7439-92-1	Lead_____	12.7_	U		P_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese		_		NR
7439-97-6	Mercury__	0.1_	U		CV
7440-02-0	Nickel___		_		NR
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	4.7_	U		P_
7440-23-5	Sodium___		_		NR
7440-28-0	Thallium_		_		NR
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____		_		NR
	Cyanide__		_		NR
			_		__

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: ___

Comments:

900220-021__BARREL_COMPOSITE

C92

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

221024

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0777 SAS No.: 11493_ SDG No.: 000000

Matrix (soil/water): WATER Lab Sample ID: 24443_____

Level (low/med): _____ Date Received: 05/08/90

% Solids: _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_		_		NR
7440-38-2	Arsenic__	4.4_	B		F_
7440-39-3	Barium___	1.7_	U		P_
7440-41-7	Beryllium		_		NR
7440-43-9	Cadmium__	3.6_	U		P_
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	4.7_	U		P_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___		_		NR
7439-89-6	Iron_____		_		NR
7439-92-1	Lead_____	12.7_	U		P_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese		_		NR
7439-97-6	Mercury__	0.1_	U		CV
7440-02-0	Nickel___		_		NR
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	1.8_	U		F_
7440-22-4	Silver___	4.7_	U		P_
7440-23-5	Sodium___		_		NR
7440-28-0	Thallium_		_		NR
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____		_		NR
	Cyanide__		_		NR
			_		__

Color Before: _______ Clarity Before: _____ Texture: _____

Color After: _______ Clarity After: _____ Artifacts: __

Comments:

900221-024__BARREL_COMPOSITE
EP_TOXICITY_METALS_ANALYSIS

PART D

SAMPLE QUALITY ASSURANCE INFORMATION

D1

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101003
Date Analyzed: 09 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	93	70-121	6200
38. Toluene-d_8	102	81-117	6200
39. P-Bromofluorobenzene	98	74-121	6200

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

D2

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

QC Identifier: Matrix Spike/Duplicate
Date Analyzed: 09 Feb 90
Sample Description: Sand (Medium)
MRD Sample Lab Number: 900209-001

Project: Phoenix-Goodyear Airport, AZ
EPA Method: SW-846, Method 8240
Analyst: David E. Splichal
GC/MS File ID: VOA0201005/VOA0301006

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	QC Limits RPD	QC Limits %Rec
DCE	BDL	6200	7200	116	6500	108	7	22	59-172
TCE	BDL	6200	7000	113	6800	113	0	24	62-137
BNZ	BDL	6200	6600	106	6200	103	3	21	66-142
TOL	BDL	6200	6500	105	6400	107	2	21	59-139
CLB	BDL	6200	6800	110	6600	110	0	21	60-133
Units	µg/kg	µg/kg	µg/kg	%	µg/kg	%			%

BDL = Below Detection Limit.

MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference

RPD = |MS - MSD| x 100 / ((MS + MSD)/2)

Compound Identification:

DCE - 1,1-Dichloroethene
TCE - Trichloroethene
BNZ - Benzene
TOL - Toluene
CLB - Chlorobenzene

Surrogate Standard Compound	MS Percent Recovered	MSD Percent Recovered	Acceptable Range	Amount of Spike (µg/kg)
1,2-Dichloroethane-d_4	94	90	70-121	6200
Toluene-d_8	101	101	81-117	6200
P-Bromofluorobenzene	102	102	74-121	6200

Approved By: Joseph Solsky **Date:** 3-12-90

D3

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
Date Analyzed: 10 Feb 90
Sample Description: Soil
GC/MS File ID: VOA0101015
EPA Method: SW-846, Method 8240 (Med)
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	96	70-121	6200
38. Toluene-d_8	102	81-117	6200
39. P-Bromofluorobenzene	100	74-121	6200

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

D4

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: EPA Check Sample
Date Analyzed: 10 Feb 90
Sample Description: Soil
Check Sample ID: WS 1084: I, VII

EPA Method: SW-846, Method 8240 (Med)
Analyst: David E. Splichal
GC/MS File ID: VOA0201016

Analyte	* Result	* True Value	** Acceptable Range
Trichlorofluoromethane	12.8	20.2	9.6-30.4
1,2-Dichloroethene	22.6	20.1	13.9-26.1
1,2-Dichloropropane	20.9	20.0	6.8-33.2
Dibromochloromethane	20.2	20.2	13.5-26.5
Benzene	21.6	19.6	12.8-27.2
1,1,2,2-Tetrachloroethane	10.7	Trace Levels	Not Given
Ethylbenzene	20.5	20.0	11.8-28.2
Xylenes (Total)	15.0	19.9	Not Given

*: Units = µg/kg

**: Units = µg/kg. Acceptable ranges found in Federal Register, 26 October 1984 Method 624, Table 5, Column 1.

Comments:

1. Although the acceptable ranges listed in the referenced method are exclusively for a water matrix, if published ranges were listed for soil, the windows would probably become wider. Therefore, results reported are acceptable and show that the GC/MS system is performing up to method required specifications.

2. EPA check sample spiked into 5-ml water containing the methanol extracted surrogate compounds. This check sample is monitoring only the performance of the GC/MS system, not the extraction efficiency of the analytes that may or may not be present in the sample.

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
1,2-Dichloroethane-d_4	116	70-121	6200
Toluene-d_8	104	81-117	6200
P-Bromofluorobenzene	98	74-121	6200

Approved By: Joseph Solsky **Date:** 3-12-90

D5

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101026
Date Analyzed: 12 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	103	70-121	6200
38. Toluene-d_8	95	81-117	6200
39. P-Bromofluorobenzene	92	74-121	6200

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

D6

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101039
Date Analyzed: 13 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	μg/kg	1000
2. Bromomethane	BDL	μg/kg	1000
3. Vinyl Chloride	BDL	μg/kg	1000
4. Chloroethane	BDL	μg/kg	1000
5. Dichloromethane	BDL	μg/kg	500
6. Acetone	BDL	μg/kg	5000
7. Carbon Disulfide	BDL	μg/kg	500
8. Trichlorofluoromethane	BDL	μg/kg	500
9. 1,1-Dichloroethene	BDL	μg/kg	500
10. 1,1-Dichloroethane	BDL	μg/kg	500
11. 1,2-Dichloroethene(total)	BDL	μg/kg	500
12. Chloroform	BDL	μg/kg	500
13. 2-Butanone	BDL	μg/kg	5000
14. 1,2-Dichloroethane	BDL	μg/kg	500
15. 1,1,1-Trichloroethane	BDL	μg/kg	500
16. Carbon Tetrachloride	BDL	μg/kg	500
17. Vinyl Acetate	BDL	μg/kg	1000
18. Dichlorobromomethane	BDL	μg/kg	500
19. 1,2-Dichloropropane	BDL	μg/kg	500
20. cis-1,3-Dichloropropene	BDL	μg/kg	500
21. Trichloroethene	BDL	μg/kg	200
22. Dibromochloromethane	BDL	μg/kg	500
23. Benzene	BDL	μg/kg	500
24. 1,1,2-Trichloroethane	BDL	μg/kg	500
25. trans-1,3-Dichloropropene	BDL	μg/kg	500
26. 2-Chloroethylvinylether	BDL	μg/kg	1000
27. Bromoform	BDL	μg/kg	500
28. 4-Methyl-2-Pentanone	BDL	μg/kg	1000
29. 2-Hexanone	BDL	μg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	μg/kg	500
31. Tetrachloroethene	BDL	μg/kg	500
32. Toluene	BDL	μg/kg	500
33. Chlorobenzene	BDL	μg/kg	500
34. Ethylbenzene	BDL	μg/kg	500
35. Styrene	BDL	μg/kg	500
36. Xylenes(Total)	BDL	μg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(μg/kg)
37. 1,2-Dichloroethane-d_4	99	70-121	6200
38. Toluene-d_8	98	81-117	6200
39. P-Bromofluorobenzene	101	74-121	6200

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

D7

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

QC Identifier: Matrix Spike/Duplicate
Date Analyzed: 13 Feb 90
Sample Description: Sand (Medium)
MRD Sample Lab Number: 900210-017
Project: Phoenix-Goodyear Airport, AZ
EPA Method: SW-846, Method 8240
Analyst: David E. Splichal
GC/MS File ID: VOA0101043/VOA0101044

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	QC Limits RPD	QC Limits %Rec
DCE	BDL	6200	6100	98	5800	94	4	22	59-172
TCE	BDL	6200	6600	106	6500	105	1	24	62-137
BNZ	BDL	6200	6600	106	6400	103	3	21	66-142
TOL	BDL	6200	6800	110	6600	106	4	21	59-139
CLB	BDL	6200	7000	113	7100	114	1	21	60-133
Units	µg/kg	µg/kg	µg/kg	%	µg/kg	%			%

BDL = Below Detection Limit.

MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference

RPD = $|MS - MSD| \times 100 / ((MS + MSD)/2)$

Compound Identification:

DCE - 1,1-Dichloroethene
TCE - Trichloroethene
BNZ - Benzene
TOL - Toluene
CLB - Chlorobenzene

Surrogate Standard Compound	MS Percent Recovered	MSD Percent Recovered	Acceptable Range	Amount of Spike(µg/kg
1,2-Dichloroethane-d_4	102	102	70-121	6200
Toluene-d_8	98	97	81-117	6200
P-Bromofluorobenzene	102	100	74-121	6200

Approved By: Joseph Solsky **Date:** 3-17-90

D8

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101047
Date Analyzed: 14 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	108	70-121	3100
38. Toluene-d_8	99	81-117	3100
39. P-Bromofluorobenzene	101	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

D9

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101058
Date Analyzed: 15 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

	Analyte	Result	Units	Detection Limits
1.	Chloromethane	BDL	µg/kg	1000
2.	Bromomethane	BDL	µg/kg	1000
3.	Vinyl Chloride	BDL	µg/kg	1000
4.	Chloroethane	BDL	µg/kg	1000
5.	Dichloromethane	BDL	µg/kg	500
6.	Acetone	BDL	µg/kg	5000
7.	Carbon Disulfide	BDL	µg/kg	500
8.	Trichlorofluoromethane	BDL	µg/kg	500
9.	1,1-Dichloroethene	BDL	µg/kg	500
10.	1,1-Dichloroethane	BDL	µg/kg	500
11.	1,2-Dichloroethene(total)	BDL	µg/kg	500
12.	Chloroform	BDL	µg/kg	500
13.	2-Butanone	BDL	µg/kg	5000
14.	1,2-Dichloroethane	BDL	µg/kg	500
15.	1,1,1-Trichloroethane	BDL	µg/kg	500
16.	Carbon Tetrachloride	BDL	µg/kg	500
17.	Vinyl Acetate	BDL	µg/kg	1000
18.	Dichlorobromomethane	BDL	µg/kg	500
19.	1,2-Dichloropropane	BDL	µg/kg	500
20.	cis-1,3-Dichloropropene	BDL	µg/kg	500
21.	Trichloroethene	BDL	µg/kg	200
22.	Dibromochloromethane	BDL	µg/kg	500
23.	Benzene	BDL	µg/kg	500
24.	1,1,2-Trichloroethane	BDL	µg/kg	500
25.	trans-1,3-Dichloropropene	BDL	µg/kg	500
26.	2-Chloroethylvinylether	BDL	µg/kg	1000
27.	Bromoform	BDL	µg/kg	500
28.	4-Methyl-2-Pentanone	BDL	µg/kg	1000
29.	2-Hexanone	BDL	µg/kg	1000
30.	1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31.	Tetrachloroethene	BDL	µg/kg	500
32.	Toluene	BDL	µg/kg	500
33.	Chlorobenzene	BDL	µg/kg	500
34.	Ethylbenzene	BDL	µg/kg	500
35.	Styrene	BDL	µg/kg	500
36.	Xylenes(Total)	BDL	µg/kg	500

	Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37.	1,2-Dichloroethane-d_4	87	70-121	3100
38.	Toluene-d_8	100	81-117	3100
39.	P-Bromofluorobenzene	94	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-17-90

D10

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank | **GC/MS File ID:** VOA0101065
Date Analyzed: 16 Feb 90 | **EPA Method:** SW-846, Method 8240 (Med)
Sample Description: Soil | **Analyst:** David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	85	70-121	3100
38. Toluene-d_8	100	81-117	3100
39. P-Bromofluorobenzene	95	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

D11

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101072
Date Analyzed: 16 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	92	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	104	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Solsky **Date:** 3-12-90

D12

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

QC Identifier: Matrix Spike/Duplicate **Project:** Phoenix-Goodyear Airport, AZ
Date Analyzed: 16 Feb 90 **EPA Method:** SW-846, Method 8240
Sample Description: Sand (Medium) **Analyst:** David E. Splichal
MRD Sample Lab Number: 900216-029 **GC/MS File ID:** VOA0501076/VOA0601077

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	QC Limits RPD	QC Limits %Rec
DCE	BDL	6200	5100	82	4900	79	4	22	59-172
TCE	BDL	6200	4700	76	4500	72	5	24	62-137
BNZ	BDL	6200	6200	100	6200	100	0	21	66-142
TOL	BDL	6200	6600	106	6300	102	4	21	59-139
CLB	BDL	6200	7300	118	6800	110	7	21	60-133
Units	µg/kg	µg/kg	µg/kg	%	µg/kg	%			%

BDL = Below Detection Limit.

MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference

RPD = $|MS - MSD| \times 100 / ((MS + MSD)/2)$

Compound Identification:

DCE - 1,1-Dichloroethene
TCE - Trichloroethene
BNZ - Benzene
TOL - Toluene
CLB - Chlorobenzene

Surrogate Standard Compound	MS Percent Recovered	MSD Percent Recovered	Acceptable Range	Amount of Spike(µg/kg
1,2-Dichloroethane-d_4	102	105	70-121	3100
Toluene-d_8	109	102	81-117	3100
P-Bromofluorobenzene	109	108	74-121	3100

Approved By: Joseph Solsky **Date:** 3-17-90

D13

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: EPA Check Sample
Date Analyzed: 16 Feb 90
Sample Description: Soil
Check Sample ID: WS 1084: II, III

EPA Method: SW-846, Method 8240 (Med)
Analyst: David E. Splichal
GC/MS File ID: VOA0101066

Analyte	* Result	* True Value	** Acceptable Range
Trichloroethene	21.5	19.8	13.3-26.8
Toluene	22.6	20.0	14.9-25.1
Chlorobenzene	22.2	19.8	13.2-26.8
Xylenes (ortho- and para-)	43.9	40.0	Not Given

*: Units = μg/kg

**: Units = μg/kg. Acceptable ranges found in Federal Register, 26 October 1984 Method 624, Table 5, Column 1.

Comments:

1. Although the acceptable ranges listed in the referenced method are exclusively for a water matrix, if published ranges were listed for soil, the windows would probably become wider. Therefore, results reported are acceptable and show that the GC/MS system is performing up to method required specifications.

2. EPA check sample spiked into 5-ml water containing the methanol extracted surrogate compounds. This check sample is monitoring only the performance of the GC/MS system, not the extraction efficiency of the analytes that may or may not be present in the sample.

Surrogate Standard Compound	Percent Recovered	Acceptable Range (%Rec)	Amount of Spike (μg/kg)
1,2-Dichloroethane-d_4	87	70-121	3100
Toluene-d_8	98	81-117	3100
P-Bromofluorobenzene	94	74-121	3100

Approved By: Joseph Solsky **Date:** 3-12-90

D14

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101083
Date Analyzed: 19 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	82	70-121	3100
38. Toluene-d_8	98	81-117	3100
39. P-Bromofluorobenzene	96	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-17-90

D15

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank
GC/MS File ID: VOA0101094
Date Analyzed: 21 Feb 90
EPA Method: SW-846, Method 8240 (Med)
Sample Description: Soil
Analyst: David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	88	70-121	3100
38. Toluene-d_8	100	81-117	3100
39. P-Bromofluorobenzene	98	74-121	3100

BDL: Below Detection Limit

Approved By: Joseph Aalsky **Date:** 3-17-90

D16

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QC Identifier: Instrument Blank **GC/MS File ID:** VOA0101105
Date Analyzed: 22 Feb 90 **EPA Method:** SW-846, Method 8240 (Med)
Sample Description: Soil **Analyst:** David E. Splichal

Analyte	Result	Units	Detection Limits
1. Chloromethane	BDL	µg/kg	1000
2. Bromomethane	BDL	µg/kg	1000
3. Vinyl Chloride	BDL	µg/kg	1000
4. Chloroethane	BDL	µg/kg	1000
5. Dichloromethane	BDL	µg/kg	500
6. Acetone	BDL	µg/kg	5000
7. Carbon Disulfide	BDL	µg/kg	500
8. Trichlorofluoromethane	BDL	µg/kg	500
9. 1,1-Dichloroethene	BDL	µg/kg	500
10. 1,1-Dichloroethane	BDL	µg/kg	500
11. 1,2-Dichloroethene(total)	BDL	µg/kg	500
12. Chloroform	BDL	µg/kg	500
13. 2-Butanone	BDL	µg/kg	5000
14. 1,2-Dichloroethane	BDL	µg/kg	500
15. 1,1,1-Trichloroethane	BDL	µg/kg	500
16. Carbon Tetrachloride	BDL	µg/kg	500
17. Vinyl Acetate	BDL	µg/kg	1000
18. Dichlorobromomethane	BDL	µg/kg	500
19. 1,2-Dichloropropane	BDL	µg/kg	500
20. cis-1,3-Dichloropropene	BDL	µg/kg	500
21. Trichloroethene	BDL	µg/kg	200
22. Dibromochloromethane	BDL	µg/kg	500
23. Benzene	BDL	µg/kg	500
24. 1,1,2-Trichloroethane	BDL	µg/kg	500
25. trans-1,3-Dichloropropene	BDL	µg/kg	500
26. 2-Chloroethylvinylether	BDL	µg/kg	1000
27. Bromoform	BDL	µg/kg	500
28. 4-Methyl-2-Pentanone	BDL	µg/kg	1000
29. 2-Hexanone	BDL	µg/kg	1000
30. 1,1,2,2-Tetrachloroethane	BDL	µg/kg	500
31. Tetrachloroethene	BDL	µg/kg	500
32. Toluene	BDL	µg/kg	500
33. Chlorobenzene	BDL	µg/kg	500
34. Ethylbenzene	BDL	µg/kg	500
35. Styrene	BDL	µg/kg	500
36. Xylenes(Total)	BDL	µg/kg	500

Surrogate Standard Compound	Percent Recovered	Acceptable Range(%Rec)	Amount of Spike(µg/kg)
37. 1,2-Dichloroethane-d_4	93	70-121	3100
38. Toluene-d_8	103	81-117	3100
39. P-Bromofluorobenzene	98	74-121	3100

BDL: Below Detection Limit **Approved By:** Joseph Solsky **Date:** 3-12-90

D17

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

QC Identifier: Matrix Spike/Duplicate **Project:** Phoenix-Goodyear Airport, AZ
Date Analyzed: 22 Feb 90 **EPA Method:** SW-846, Method 8240
Sample Description: Sand (Medium) **Analyst:** David E. Splichal
MRD Sample Lab Number: 900221-015 **GC/MS File ID:** VOA0401109/VOA0501110

Analyte	Sample Result	Spike Added	Conc MS	%Rec MS	Conc MSD	%Rec MSD	RPD	QC Limits RPD	QC Limits %Rec
DCE	BDL	3100	3200	103	3000	97	6	22	59-172
TCE	BDL	3100	3500	113	3400	110	3	24	62-137
BNZ	BDL	3100	3100	100	3000	97	3	21	66-142
TOL	BDL	3100	3300	106	3200	103	3	21	59-139
CLB	BDL	3100	3500	113	3600	116	3	21	60-133
Units	µg/kg	µg/kg	µg/kg	%	µg/kg	%			%

BDL = Below Detection Limit.

MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference

RPD = |MS - MSD| x 100 / ((MS + MSD)/2)

Compound Identification:

DCE - 1,1-Dichloroethene
TCE - Trichloroethene
BNZ - Benzene
TOL - Toluene
CLB - Chlorobenzene

Surrogate Standard Compound	MS Percent Recovered	MSD Percent Recovered	Acceptable Range	Amount of Spike(µg/kg
1,2-Dichloroethane-d_4	100	103	70-121	3100
Toluene-d_8	105	103	81-117	3100
P-Bromofluorobenzene	103	107	74-121	3100

Approved By: Joseph Solsky **Date:** 3-12-90

D18

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.

RESULT SHEET FOR COLOR AND TEXTURE
For Work Orders 641-650

EHRT No.	Customer Sample No.	Work Order	Color	Texture	Notebook & Page No.
22827	900130-011	641	Yellowish-Orange	Wet Sand	127, Pg. 8 & 9
22830	900130-014	641	Gray	Clay	127, Pg. 8 & 9
22854	900201-001	643	Brown	Wet Sand	127, Pg. 8 & 9
22855	900201-003	643	Brown	Sand with Water	127, Pg. 8 & 9
22856	900201-004	643	Orange	Sand with Water & Leaves	127, Pg. 8 & 9
22882	900205-010	644	Orange	Powdery Soil	127, Pg. 8 & 9
22883	900205-012	644	Brown	Sand	127, Pg. 8 & 9
22884	900205-024	645	Gray	Clay	127, Pg. 8 & 9
22885	900205-025	645	Gray	Clay	127, Pg. 8 & 9
22886	900205-026	645	Gray	Clay	127, Pg. 8 & 9
22887	900205-027	645	Gray	Clay	127, Pg. 8 & 9
22888	900205-028	645	Gray	Clay	127, Pg. 8 & 9
22889	900205-029	645	Gray	Clay	127, Pg. 8 & 9
22890	900205-030	645	Gray	Clay	127, Pg. 8 & 9
22891	900205-031	645	Grey	Clay	127, Pg. 8 & 9
22892	900205-032	645	Grey	Clay	127, Pg. 8 & 9
22893	900205-033	645	Grey	Clay	127, Pg. 8 & 9
22930	900206-008	647	Brown	Soil	127, Pg. 8 & 9
22931	900206-010	647	Orange	Soil	127, Pg. 8 & 9
[illegible]32	900207-009	647	Brown	Soil	127, Pg. 8 & 9
[illegible]433	900206-018	648	Brown	Sand	127, Pg. 8 & 9
22935	900207-003	649	Orangish-Brown	Water at Top of the Sand	127, Pg. 8 & 9

D 19

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0777 SAS No.: 11493_ SDG No.: 000000

Initial Calibration Source: EPA_WP1083__

Continuing Calibration Source: EPA_WP1083__

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum	500.0	524.10	104.8	500.0	519.90	104.0			P
Antimony	500.0	506.30	101.3	500.0	547.30	109.5			P
Arsenic	20.0	19.90	99.5	20.0	19.70	98.5			F
Barium	500.0	459.40	91.9	500.0	454.70	90.9			P
Beryllium	500.0	458.60	91.7	500.0	460.20	92.0			P
Cadmium	500.0	511.00	102.2	500.0	527.30	105.5			P
Calcium									NR
Chromium	500.0	471.00	94.2	500.0	496.10	99.2			P
Cobalt									NR
Copper	500.0	468.00	93.6	500.0	496.10	99.2			P
Iron	500.0	466.60	93.3	500.0	480.40	96.1			P
Lead	500.0	495.80	99.2	500.0	496.40	99.3			P
Magnesium									NR
Manganese	500.0	472.70	94.5	500.0	477.90	95.6			P
Mercury	5.0	5.50	110.0	5.0	5.60	112.0	4.45	89.0	CV
Nickel	500.0	472.20	94.4	500.0	494.00	98.8			P
Potassium									NR
Selenium	20.0	18.60	93.0	20.0	21.70	108.5			F
Silver	50.0	50.40	100.8	50.0	53.50	107.0			P
Sodium									NR
Thallium	3000.0	3087.00	102.9	3000.0	2929.00	97.6			P
Vanadium									NR
Zinc	500.0	499.50	99.9	500.0	520.00	104.0			P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

D20

U.S. EPA - CLP

3
BLANKS

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194

Lab Code: W88 Case No.: W0777 SAS No.: 11493 SDG No.: 000000

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	26.2	U	26.2	U					2.625	U	P
Antimony	14.0	B	14.0	B					1.398	U	P
Arsenic	3.0	U	3.0	U					0.300	U	F
Barium	1.7	B	1.7	B					0.170	U	P
Beryllium	0.5	U	0.5	B					0.051	U	P
Cadmium	3.6	U	3.6	U					0.364	U	P
Calcium											NR
Chromium	4.7	U	4.7	U					0.471	U	P
Cobalt											NR
Copper	7.4	B	7.4	B					0.738	U	P
Iron	5.4	B	5.4	B					0.538	U	P
Lead	12.7		12.7						1.271	U	P
Magnesium											NR
Manganese	0.6	B	0.6	U					0.056	U	P
Mercury	0.1	U	0.1	U					0.010	U	CV
Nickel	3.4	U	3.4	U					0.343	U	P
Potassium											NR
Selenium	1.8	U	1.8	U					0.180	U	F
Silver	4.7	B	4.7	U					0.468	U	P
Sodium											NR
Thallium	1303.9		1303.9						130.388		P
Vanadium											NR
Zinc	1.9	U	1.9	U					0.192	U	P
Cyanide											NR

D21

U.S. EPA - CLP

4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W88___   Case No.: W0777   SAS No: 11493_   SDG No.: 000000

ICP ID Number: 2483________   ICS Source: ____________

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	500000	500000	471000	469900.0	94.0		457000.0	91.4
Antimony								
Arsenic								
Barium		500		481.0	96.2		472.0	94.4
Beryllium		500		472.0	94.4		444.0	88.8
Cadmium		1000		1004.0	100.4		931.0	93.1
Calcium	500000	500000	489900	480800.0	96.2		452500.0	90.5
Chromium		500		472.0	94.4		458.0	91.6
Cobalt		500		492.0	98.4		464.0	92.8
Copper		500		466.0	93.2		475.0	95.0
Iron	200000	200000	188100	187200.0	93.6		178800.0	89.4
Lead		1000		1063.0	106.3		955.0	95.5
Magnesium	500000	500000	475800	469300.0	93.9		450600.0	90.1
Manganese		500		511.0	102.2		481.0	96.2
Mercury								
Nickel		1000		911.0	91.1		866.0	86.6
Potassium								
Selenium								
Silver		1000		974.0	97.4		933.0	93.3
Sodium								
Thallium								
Vanadium		500		548.0	109.6		497.0	99.4
Zinc		1000		1014.0	101.4		952.0	95.2

D22

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

209017S

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0777 SAS No.: 11493_ SDG No.: 000000

Matrix (soil/water): WATER Level (low/med): _____

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum_			_		_			_	NR
Antimony_			_		_			_	NR
Arsenic__	75-125_	25.2000_	_	5.4000	B	20.0	99.0	_	F_
Barium___	75-125_	479.4000_	_	153.3000	B	300.0	108.7	_	P_
Beryllium			_		_			_	NR
Cadmium__	75-125_	1055.0000_	_	3.6430	U	1000.0	105.5	_	P_
Calcium__			_		_			_	NR
Chromium_	75-125_	1039.0000_	_	4.7100	U	1000.0	103.9	_	P_
Cobalt___			_		_			_	NR
Copper___			_		_			_	NR
Iron_____			_		_			_	NR
Lead_____	75-125_	1036.0000_	_	12.7090	U	1000.0	103.6	_	P_
Magnesium			_		_			_	NR
Manganese			_		_			_	NR
Mercury__	75-125_	5.5300_	_	0.1000	U	5.0	110.6	_	CV
Nickel___			_		_			_	NR
Potassium			_		_			_	NR
Selenium_	75-125_	19.0000_	_	1.8000	U	20.0	95.0	_	F_
Silver___	75-125_	977.9000_	_	4.6800	U	1000.0	97.8	_	P_
Sodium___			_		_			_	NR
Thallium_			_		_			_	NR
Vanadium_			_		_			_	NR
Zinc_____			_		_			_	NR
Cyanide__			_		_			_	NR
			_		_			_	__

Comments:

PART E

QUALITY ASSURANCE TEST RESULTS

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W88___   Case No.: W0649   SAS No.: 11194_   SDG No.: 000000

SOW No.: ______

EPA Sample No.	Lab Sample ID.
__207003__	22935______

Were ICP interelement corrections applied ?   Yes/No YES

Were ICP background corrections applied ?   Yes/No YES
If yes - were raw data generated before
application of background corrections ?   Yes/No NO_

Comments:
PHOENIX_GOODYEAR_AIRPORT__DATE_OF_ANALYSIS_FEBRUARY_13,_1990__________
ICP_G.STAKE_NB129_PG23_METHOD_6010/_FURNACE_P.BARNWELL_NB121_PG49_____
METHOD_AS7060_SE7740/_COLD_VAPOR_J.RADER_NB116_PG99_METHOD_7471/_%____
SOLIDS_M.REDDY_NB113_PG71

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: [signature]

Date: 3/22/90

E2

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

207003

Lab Name: ENVIR._HEALTH_RESEARCH_TE   Contract: 1194______

Lab Code: W88___   Case No.: W0649   SAS No.: 11194_   SDG No.: 000000

Matrix (soil/water): SOIL_   Lab Sample ID: 22935_____

Level (low/med): _____   Date Received: 02/08/90

% Solids: _80.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_		_		NR
7440-36-0	Antimony_	0.98_	U		P_
7440-38-2	Arsenic_	3.6_	_		F_
7440-39-3	Barium___		_		NR
7440-41-7	Beryllium	0.16_	B		P_
7440-43-9	Cadmium__	0.26_	U		P_
7440-70-2	Calcium__		_		NR
7440-47-3	Chromium_	30.8_	_		P_
7440-48-4	Cobalt___		_		NR
7440-50-8	Copper___	29.2_	_		P_
7439-89-6	Iron_____		_		NR
7439-92-1	Lead_____	9.3_	_		P_
7439-95-4	Magnesium		_		NR
7439-96-5	Manganese		_		NR
7439-97-6	Mercury__	0.05	U		CV
7440-02-0	Nickel___	10.1_	_		P_
7440-09-7	Potassium		_		NR
7782-49-2	Selenium_	0.13_	U		F_
7440-22-4	Silver___	0.33_	U		P_
7440-23-5	Sodium___		_		NR
7440-28-0	Thallium_	92.0_	U		P_
7440-62-2	Vanadium_		_		NR
7440-66-6	Zinc_____	53.8_	_		P_
	Cyanide__		_		NR
			_		__

Color Before: ______   Clarity Before: ______   Texture: ______

Color After: ______   Clarity After: ______   Artifacts: ___

Comments:

900207-003__PGA-SS-010-QA
POST_DIGEST_SPIKE_(ARSENIC)_=_94.4%_RECOVERY
POST_DIGEST_SPIKE_(SELENIUM)_=_93.1%_RECOVERY

E3

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: WO649 SAS No.: 11194_ SDG No.: 000000

Initial Calibration Source: EPA_WP1083__

Continuing Calibration Source: EPA_WP1083__

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony	500.0	491.00	98.2	500.0	480.30	96.1			P
Arsenic	20.0	20.30	101.5	20.0	20.60	103.0			F
Barium									NR
Beryllium	500.0	495.70	99.1	500.0	477.20	95.4			P
Cadmium	500.0	493.90	98.8	500.0	515.80	103.2			P
Calcium									NR
Chromium	500.0	502.70	100.5	500.0	494.80	99.0			P
Cobalt									NR
Copper	500.0	488.10	97.6	500.0	506.80	101.4			P
Iron									NR
Lead	500.0	486.60	97.3	500.0	507.20	101.4			P
Magnesium									NR
Manganese									NR
Mercury	5.0	4.86	97.2	5.0	5.44	108.8			CV
Nickel	500.0	469.90	94.0	500.0	490.20	98.0			P
Potassium									NR
Selenium	20.0	18.10	90.5	20.0	19.40	97.0			F
Silver	50.0	51.40	102.8	50.0	52.90	105.8			P
Sodium									NR
Thallium	2000.0	2015.00	100.8	2000.0	2147.00	107.4			P
Vanadium									NR
Zinc	500.0	482.30	96.5	500.0	500.90	100.2			P
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

E4

U.S. EPA - CLP

3
BLANKS

Lab Name: ENVIR._HEALTH_RESEARCH_TE Contract: 1194______

Lab Code: W88___ Case No.: W0649 SAS No.: 11194_ SDG No.: 000000

Preparation Blank Matrix (soil/water): SOIL_

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											NR
Antimony	14.0	B	14.0	B					1.398	U	P
Arsenic	3.0	U	3.0	U					0.300	U	F
Barium											NR
Beryllium	0.5	U	0.5	B					0.051	U	P
Cadmium	3.6	U	3.6	U					0.364	U	P
Calcium											NR
Chromium	4.7	U	4.7	U					0.471	U	P
Cobalt											NR
Copper	7.4	B	7.4	B					0.738	U	P
Iron											NR
Lead	12.7	J	12.7	J					1.271	U	P
Magnesium											NR
Manganese											NR
Mercury	0.1	U	0.1	U					0.025	U	CV
Nickel	3.4	U	3.4	U					0.343	U	P
Potassium											NR
Selenium	1.8	U	1.8	U					0.180	U	F
Silver	4.7	B	4.7	U					0.468	U	P
Sodium											NR
Thallium	1303.9	J	1303.9	J					130.388	J	P
Vanadium											NR
Zinc	1.9	U	1.9	U					0.192	U	P
Cyanide											NR

E5

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

900209-016

Customer:PHOENIX GOODYEAR AIRPORT (COE)

Source: PGA-SB-002-55-QA   Work Order:655   Proj.No.:11212

Matrix: (soil/water) SOIL   Lab Sample ID: 23079

Sample wt/vol: 1 (g/mL) G   Lab File ID: >V0244

Level: (low/med) LOW   Date Received: 02/13/90

% Moisture: not dec.12   Date Analyzed: 02/16/90

Column: (pack/cap) PACK   Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
74-87-3	Chloromethane	2.8	U
74-83-9	Bromomethane	2.8	U
75-01-4	Vinyl Chloride	2.8	U
75-00-3	Chloroethane	2.8	U
75-09-2	Methylene Chloride	5.7	U
67-64-1	Acetone	5.7	U
75-15-0	Carbon Disulfide	2.8	U
75-35-4	1,1-Dichloroethene	2.8	U
75-34-3	1,1-Dichloroethane	2.8	U
540-59-0	1,2-Dichloroethene (total)	27.	
67-66-3	Chloroform	2.8	U
107-02-2	1,2-Dichloroethane	2.8	U
78-93-3	2-Butanone	2.8	U
71-55-6	1,1,1-Trichloroethane	2.8	U
56-23-5	Carbon Tetrachloride	2.8	U
108-05-4	Vinyl Acetate	5.7	U
75-27-4	Bromodichloromethane	2.8	U
78-87-5	1,2-Dichloropropane	2.8	U
10061-01-5	cis-1,3-Dichloropropene	2.8	U
79-01-6	Trichloroethene	2.8	U
124-48-1	Dibromochloromethane	2.8	U
79-00-5	1,1,2-Trichloroethane	2.8	U
71-43-2	Benzene	47.	
10061-02-6	trans-1,3-Dichloropropene	2.8	U
75-25-2	Bromoform	2.8	U
108-10-1	4-Methyl-2-pentanone	11.	U
591-78-6	2-Hexanone	5.7	U
127-18-4	Tetrachloroethene	2.8	U
79-34-5	1,1,2,2-Tetrachloroethane	2.8	U
108-88-3	Toluene	22.	
108-90-7	Chlorobenzene	2.8	U
100-41-4	Ethylbenzene	92.	
100-42-5	Styrene	2.8	U
133-02-7	Xylene (total)	2.8	U

E6

SOIL VOLATILE SURROGATE RECOVERY

Customer:U.S. ARMY CORPS OF ENGINEERS — Work Order:655

Source: PHEONIX GOODYEAR AIRPORT — Proj. No.:11212

Level:(low/med) LOW

	EPA SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	TOT OUT
01	900209-016	96	114	107		0
02	900210-008	94	105	109		0
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
S1 (TOL)	= Toluene-d8	(81-117)
S2 (BFB)	= Bromofluorobenzene	(74-121)
S3 (DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

E7

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

900210-008

Customer:PHOENIX GOODYEAR AIRPORT (COE)

Source: PGA-SB-003-25-QA

Work Order:655 Proj.No.:11212

Matrix: (soil/water) SOIL

Lab Sample ID: 23081

Sample wt/vol: 1 (g/mL) G

Lab File ID: >V0245

Level: (low/med) LOW

Date Received: 02/13/90

% Moisture: not dec.23

Date Analyzed: 02/16/90

Column: (pack/cap) PACK

Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
74-87-3	Chloromethane	3.2	U
74-83-9	Bromomethane	3.2	U
75-01-4	Vinyl Chloride	3.2	U
75-00-3	Chloroethane	3.2	U
75-09-2	Methylene Chloride	6.5	U
67-64-1	Acetone	6.5	U
75-15-0	Carbon Disulfide	3.2	U
75-35-4	1,1-Dichloroethene	3.2	U
75-34-3	1,1-Dichloroethane	3.2	U
540-59-0	1,2-Dichloroethene (total)	3.2	U
67-66-3	Chloroform	3.2	U
107-02-2	1,2-Dichloroethane	3.2	U
78-93-3	2-Butanone	3.2	U
71-55-6	1,1,1-Trichloroethane	3.2	U
56-23-5	Carbon Tetrachloride	3.2	U
108-05-4	Vinyl Acetate	6.5	U
75-27-4	Bromodichloromethane	3.2	U
78-87-5	1,2-Dichloropropane	3.2	U
10061-01-5	cis-1,3-Dichloropropene	3.2	U
79-01-6	Trichloroethene	3.2	U
124-48-1	Dibromochloromethane	3.2	U
79-00-5	1,1,2-Trichloroethane	3.2	U
71-43-2	Benzene	3.2	U
10061-02-6	trans-1,3-Dichloropropene	3.2	U
75-25-2	Bromoform	3.2	U
108-10-1	4-Methyl-2-pentanone	13.	U
591-78-6	2-Hexanone	6.5	U
127-18-4	Tetrachloroethene	3.2	U
79-34-5	1,1,2,2-Tetrachloroethane	3.2	U
108-88-3	Toluene	38.	
108-90-7	Chlorobenzene	3.2	U
100-41-4	Ethylbenzene	3.2	U
100-42-5	Styrene	3.2	U
133-02-7	Xylene (total)	3.2	U

E8

SOIL VOLATILE SURROGATE RECOVERY

Customer: U.S. ARMY CORPS OF ENGINEERS — Work Order: 655

Source: PHEONIX GOODYEAR AIRPORT — Proj. No.: 11212

Level: (low/med) LOW

	EPA SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	TOT OUT
01	900209-016	96	114	107		0
02	900210-008	94	105	109		0
03						
04						
05						
06						
07						
08						
09						
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17						
18						
19						
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22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
S1 (TOL)	= Toluene-d8	(81-117)
S2 (BFB)	= Bromofluorobenzene	(74-121)
S3 (DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

E9

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
900214-029

Customer:PHOENIX GOODYEAR AIRPORT (COE)

Source: PGA-SB-004-25-QA Work Order:663 Proj.No.:11224

Matrix: (soil/water) SOIL Lab Sample ID: 23144

Sample wt/vol: 1.0 (g/mL) G Lab File ID: >V0266

Level: (low/med) LOW Date Received: 02/16/90

% Moisture: not dec.23 Date Analyzed: 02/23/90

Column: (pack/cap) PACK Dilution Factor: 1.00000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
74-87-3	Chloromethane	3.2	U
74-83-9	Bromomethane	3.2	U
75-01-4	Vinyl Chloride	3.2	U
75-00-3	Chloroethane	3.2	U
75-09-2	Methylene_Chloride	6.5	U
67-64-1	Acetone	6.5	U
75-15-0	Carbon Disulfide	3.2	U
75-35-4	1,1-Dichloroethene	3.2	U
75-34-3	1,1-Dichloroethane	3.2	U
540-59-0	1,2-Dichloroethene_(total)	3.2	U
67-66-3	Chloroform	3.2	U
107-02-2	1,2-Dichloroethane	3.2	U
78-93-3	2-Butanone	3.2	U
71-55-6	1,1,1-Trichloroethane	3.2	U
56-23-5	Carbon Tetrachloride	3.2	U
108-05-4	Vinyl Acetate	6.5	U
75-27-4	Bromodichloromethane	3.2	U
78-87-5	1,2-Dichloropropane	3.2	U
10061-01-5	cis-1,3-Dichloropropene	3.2	U
79-01-6	Trichloroethene	3.2	U
124-48-1	Dibromochloromethane	3.2	U
79-00-5	1,1,2-Trichloroethane	3.2	U
71-43-2	Benzene	3.2	U
10061-02-6	trans-1,3-Dichloropropene	3.2	U
75-25-2	Bromoform	3.2	U
108-10-1	4-Methyl-2-pentanone	13.	U
591-78-6	2-Hexanone	6.5	U
127-18-4	Tetrachloroethene	3.2	U
79-34-5	1,1,2,2-Tetrachloroethane	3.2	U
108-88-3	Toluene	3.2	U
108-90-7	Chlorobenzene	3.2	U
100-41-4	Ethylbenzene	3.2	U
100-42-5	Styrene	3.2	U
133-02-7	Xylene (total)	3.2	U

SOIL VOLATILE SURROGATE RECOVERY

Customer:U.S. ARMY CORPS OF ENGINEERS Work Order:663

Source: PHOENIX GOODYEAR AIRPORT Proj. No.:11224

Level:(low/med) LOW

	EPA SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	TOT OUT
01	900214-029	95	100	99		0
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
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27						
28						
29						
30						

	QC LIMITS
S1 (TOL) = Toluene-d8	(81-117)
S2 (BFB) = Bromofluorobenzene	(74-121)
S3 (DCE) = 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

E11

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

900216-033

Customer: PHOENIX-GOODYEAR AIRPORT (COE)

Source: PGA-SB-005-25-QA   Work Order:669   Proj. No:11240

Matrix: (soil/water) SOIL   Lab Sample ID: 23194

Sample wt/vol: 1 (g/mL) G   Lab File ID: >MR640

Level: (low/med) LOW   Date Received: 02/21/90

%Moisture: not dec. 29   Date Analyzed: 03/01/90

Column: (packed/cap) PACK   Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
71-43-2	Benzene	3.5	U
75-27-4	Bromodichloromethane	3.5	U
75-25-2	Bromoform	3.5	U
108-10-1	4-Methyl-2-Pentanone	14.	U
591-78-6	2-Hexanone	7.0	U
74-83-9	Bromomethane	3.5	U
56-23-6	Carbon Tetrachloride	3.5	U
108-05-4	Vinyl Acetate	7.0	U
108-90-7	Chlorobenzene	3.5	U
75-00-3	Chloroethane	3.5	U
75-01-4	Vinyl Chloride	3.5	U
67-66-3	Chloroform	3.5	U
74-87-3	Chloromethane	3.5	U
124-48-1	Dibromochloromethane	3.5	U
75-09-2	Methylene_Chloride	7.0	U
67-64-1	Acetone	7.0	U
75-15-0	Carbon Disulfide	3.5	U
75-34-3	1,1-Dichloroethane	3.5	U
107-02-2	1,2-Dichloroethane	3.5	U
78-93-3	2-Butanone	7.0	U
75-35-4	1,1-Dichloroethene	3.5	U
156-60-5	1,2-Dichloroethene_(total)	3.5	U
78-87-5	1,2-Dichloropropane	3.5	U
10061-01-5	cis-1,3-Dichloropropene	3.5	U
10061-02-6	trans-1,3-Dichloropropene	3.5	U
100-41-4	Ethyl Benzene	3.5	U
79-34-5	1,1,2,2-Tetrachloroethane	3.5	U
127-18-4	Tetrachloroethene	3.5	U
108-88-3	Toluene	3.5	U
71-55-6	1,1,1-Trichloroethane	3.5	U
79-00-5	1,1,2-Trichloroethane	3.5	U
79-01-6	Trichloroethene	3.5	U
100-42-5	Styrene	3.5	U
133-02-7	Xylene (total)	3.5	U

E12

SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

900220-011

Customer: PHOENIX-GOODYEAR AIRPORT (COE)

Source: PGA-SB-008-25-QA   Work Order:669   Proj. No:11240

Matrix: (soil/water) SOIL   Lab Sample ID: 23198

Sample wt/vol: 1.0 (g/mL) G   Lab File ID: >MR639

Level: (low/med) LOW   Date Received: 02/21/90

%Moisture: not dec. 3.0   Date Analyzed: 03/01/90

Column: (packed/cap) PACK   Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg	Q
71-43-2	Benzene	2.6	U
75-27-4	Bromodichloromethane	2.6	U
75-25-2	Bromoform	2.6	U
108-10-1	4-Methyl-2-Pentanone	10.	U
591-78-6	2-Hexanone	5.2	U
74-83-9	Bromomethane	2.6	U
56-23-6	Carbon Tetrachloride	2.6	U
108-05-4	Vinyl Acetate	5.2	U
108-90-7	Chlorobenzene	2.6	U
75-00-3	Chloroethane	2.6	U
75-01-4	Vinyl Chloride	2.6	U
67-66-3	Chloroform	2.6	U
74-87-3	Chloromethane	2.6	U
124-48-1	Dibromochloromethane	2.6	U
75-09-2	Methylene_Chloride	5.2	U
67-64-1	Acetone	5.2	U
75-15-0	Carbon Disulfide	2.6	U
75-34-3	1,1-Dichloroethane	2.6	U
107-02-2	1,2-Dichloroethane	2.6	U
78-93-3	2-Butanone	5.2	U
75-35-4	1,1-Dichloroethene	2.6	U
156-60-5	1,2-Dichloroethene_(total)	2.6	U
78-87-5	1,2-Dichloropropane	2.6	U
10061-01-5	cis-1,3-Dichloropropene	2.6	U
10061-02-6	trans-1,3-Dichloropropene	2.6	U
100-41-4	Ethyl Benzene	2.6	U
79-34-5	1,1,2,2-Tetrachloroethane	2.6	U
127-18-4	Tetrachloroethene	2.6	U
108-88-3	Toluene	2.6	U
71-55-6	1,1,1-Trichloroethane	2.6	U
79-00-5	1,1,2-Trichloroethane	2.6	U
79-01-6	Trichloroethene	2.6	U
100-42-5	Styrene	2.6	U
133-02-7	Xylene (total)	2.6	U

E 13

SOIL VOLATILE SURROGATE RECOVERY

Customer:U.S. ARMY CORPS OF ENGINEERS — Work Order:669

Source: PHOENIX-GOODYEAR AIRPORT — Proj. No.:11240

Level:(low/med) LOW

	EPA SAMPLE NO.	S1 (TOL)#	S2 (BFB)#	S3 (DCE)#	OTHER	TOT OUT
01	900216-033	96	75	72		0
02	900220-011	97	78	77		0
03						
04						
05						
06						
07						
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25						
26						
27						
28						
29						
30						

		QC LIMITS
S1 (TOL)	= Toluene-d8	(81-117)
S2 (CHL)	= Bromofluorobenzene	(74-121)
S3 (DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

E 14

ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
VOLATILE ORGANIC ANALYSIS

CUSTOMER NAME: U.S. ARMY CORPS OF ENGINEERS - DR. JOE SOLSKY

SAMPLE SOURCE: Phoenix Goodyear Airport (PGA-SB-007-25-QA)

WORK ORDER NO.:	675	PROJECT NO.:	11249
DATE EXTRACTED:	N/A	DATE ANALYZED:	02-23-90
SAMPLE TYPE:	Soil Sample	SAMPLE WEIGHT:	1.00
ANALYST:	J. Tobler	PERCENT SOLIDS:	76.00
CUSTOMER SAMPLE NO.:	900221-014	EHRT SAMPLE NO.:	23299
LAB NOTEBOOK NO.:	123, Pg. 45	METHOD NO.:	EPA 8240

	COMPOUNDS			RESULT ug/kg DRY WEIGHT
1.	Chloromethane	-	<	6.58
2.	Bromoethane	-	<	6.58
3.	Vinyl Chloride	-	<	6.58
4.	Chloroethane	-	<	6.58
5.	Methylene Chloride	-	<	13.16
6.	Acetone	-	<	32.89
7.	Carbon Disulfide	-	<	6.58
8.	1,1-Dichloroethene	-	<	6.58
9.	1,1-Dichloroethane	-	<	6.58
10.	1,2-Dichloroethene	-	<	6.58
11.	Chloroform	-	<	6.58
12.	1,2-Dichloroethane	-	<	6.58
13.	2-Butanone	-	<	6.58
14.	1,1,1,-Trichloroethane	-	<	6.58
15.	Carbon Tetrachloride	-	<	6.58
16.	Vinyl Acetate	-	<	65.79
17.	Bromodichloromethane	-	<	6.58
18.	1,2-Dichloropropane	-	<	6.58
19.	cis-1,3-Dichloropropene	-	<	6.58
20.	Trichloroethene	-	<	6.58
21.	Dibromochloromethane	-	<	6.58
22.	1,1,2-Trichloroethane	-	<	6.58
23.	Benzene	-	<	6.58
24.	trans-1,3-Dichloropropene	-	<	6.58
25.	Bromoform	-	<	6.58

E 15

CUSTOMER SAMPLE NO.: 900221-014 EHRT SAMPLE NO.: 23299

26.	4-Methyl-2-Pentanone	-	<	32.89
27.	2-Hexanone	-	<	32.89
28.	Tetrachloroethene	-	<	6.58
29.	1,1,2,2-Tetrachloroethane	-	<	6.58
30.	Toluene	-	<	6.58
31.	Chlorobenzene	-	<	6.58
32.	Ethylbenzene	-	<	6.58
33.	Styrene	-	<	6.58
34.	Xylene	-	<	6.58

SURROGATE STANDARDS - % RECOVERIES

1,2-Dichloroethane-d4	-	100%
Toluene-d8	-	97%
Bromofluorobenzene	-	119%

QUALITY CONTROL OFFICER:

DATE: 4/11/90

E16

Lab Sample Number :90/01715 Project Leader :Lyman H. Howe

Sample ID Information :PGA-SB-002-45-QA
Sample type/matrix :SEDIMENT
Sample collection date :900208
Sample login date :900213 Sample received by lab :900213
Sample account number :4274-011300-69657.104A

Alt. IDC	Analysis Performed	result	units
00687	Carbon, Org in Sediment	2.0	g/Kg

E17

TVA Environmental Chemistry — Chattanooga, Tennessee

04/26/90 — FINAL DATA REPORT — 14:28

Lab Sample Number :90.01716 — Project Leader :Lyman H. Howe

Sample ID Information :PGA-SB-005-56-QA
Sample type/matrix :SEDIMENT
Sample collection date :900209
Sample login date :900213 — Sample received by lab :900215
Sample account number :4274-011300-69657.104A

Alt. IDC	Analysis Performed	result	units
00687	Carbon, Org in Sediment	4.0	g/Kg

E18

TVA Environmental Chemistry	Chattanooga, Tennessee
04/26/90 FINAL DATA REPORT	14:27

Lab Sample Number :90/01788   Project Leader :Lyman H. Howe

Sample ID Information :PGA-SB-004-30-QA
Sample type/matrix :SEDIMENT
Sample collection date :900213
Sample login date :900220   Sample received by lab :900216
Sample account number :4274-011300-69657.105

Alt. IDC	Analysis Performed	result	units
00687	Carbon, Org in Sediment	25.	g/Kg

E19

TVA Environmental Chemistry		Chattanooga, Tennessee
04/26/90	FINAL DATA REPORT	14:27
		Page 1

Lab Sample Number :90/01864 Project Leader :Lyman H. Howe

Sample ID Information :PGA-SB-005-30-QA
Sample type/matrix :SEDIMENT
Sample collection date :900215
Sample login date :900221 Sample received by lab :900221
Sample account number :4274-011300-69657.106

Alt. IDC	Analysis Performed	result	units
00687	Carbon, Org in Sediment	3.0	g/Kg

E20

Lab Sample Number :90/01865 Project Leader :Lyman H. Howe

Sample ID Information :PGA-SB-008-30-QA
Sample type/matrix :SEDIMENT
Sample collection date :900216
Sample login date :900221 Sample received by lab :900221
Sample account number :4274-011300-69657.106

Alt. IDC	Analysis Performed	result	units
00687	Carbon, Org in Sediment	2.0	g/Kg

E21

Lab Sample Number :90/01930 Project Leader :Lyman H. Howe

Sample ID Information :PGA-SB-007-30-QA
Sample type/matrix :SEDIMENT
Sample collection date :900219
Sample login date :900223 Sample received by lab :900223
Sample account number :4274-011300-69657.108

Alt. IDC	Analysis Performed	result	units
00687	Carbon, Org in Sediment	< 1.0	g/Kg

PART F

QUALITY ASSURANCE/QUALITY CONTROL DATA COMPARISON TABLES

F1

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QA Sample ID.: PGA-SS-010-QA
Material Description: Soil
Contractor's Sample ID.: PGA-SS-010
Date Sampled: 04 Feb 90

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
METALS							
Arsenic	3.6	3.3	mg/kg	Lead	9.3	21	mg/kg
Antimony	<0.98	<50	mg/kg	Mercury	<0.05	<0.05	mg/kg
Cadmium	<0.26	<3	mg/kg	Selenium	<0.13	<0.2	mg/kg
Chromium	30.8	44	mg/kg	Silver	<0.33	<10	mg/kg
Beryllium	0.16	<2	mg/kg	Nickel	10.1	14	mg/kg
Copper	29.2	51	mg/kg	Thallium	92	<100	mg/kg
				Zinc	53.8	53	mg/kg

COMMENTS: Data agreed.

F2

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QA Sample ID.: PGA-SB-002-55-QA
Material Description: Soil

Contractor's Sample ID.: PGA-SB-002-55
Date Sampled: 08 Feb 90

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	<5.7	<5000	µg/kg	1,2-Dichloropropane	<2.8	<500	µg/kg
Benzene	47	<500	µg/kg	cis-1,3-Dichloropropene	<2.8	<500	µg/kg
Bromodichloromethane	<2.8	<500	µg/kg	trans-1,3-Dichloropropene	<2.8	<500	µg/kg
Bromoform	<2.8	<500	µg/kg	Ethylbenzene	92	<500	µg/kg
Bromomethane	<2.8	<1000	µg/kg	2-Hexanone	<5.7	<1000	µg/kg
2-Butanone	<2.8	<5000	µg/kg	Methylene chloride	<2.8	<500	µg/kg
Carbon disulfide	<2.8	<500	µg/kg	4-Methyl-2-pentanone	<11	<1000	µg/kg
Carbon tetrachloride	<2.8	<500	µg/kg	Styrene	<2.8	<500	µg/kg
Chlorobenzene	<2.8	<500	µg/kg	1,1,2,2-Tetrachloroethane	<2.8	<500	µg/kg
Chlorodibromomethane	<2.8	<500	µg/kg	Tetrachloroethene	<2.8	<500	µg/kg
Chloroethane	<2.8	<1000	µg/kg	Toluene	22	<500	µg/kg
2-Chloroethyl vinyl ether	-	<1000	µg/kg	1,1,1-Trichloroethane	<2.8	<500	µg/kg
Chloroform	<2.8	<500	µg/kg	1,1,2-Trichloroethane	<2.8	<500	µg/kg
Chloromethane	<2.8	<1000	µg/kg	Trichloroethene	<2.8	<200	µg/kg
1,1-Dichloroethane	<2.8	<500	µg/kg	Trichlorofluoromethane	-	<500	µg/kg
1,2-Dichloroethane	<2.8	<500	µg/kg	Vinyl Acetate	<5.7	<1000	µg/kg
1,1-Dichloroethene	<2.8	<500	µg/kg	Vinyl Chloride	<2.8	<1000	µg/kg
1,2-Dichloroethene (Total)	27	<500	µg/kg	Xylenes (Total)	<2.8	<500	µg/kg

COMMENTS: Data agreed.
-: Not analyzed or not reported.

F3

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QA Sample ID.: PGA-SB-003-25-QA
Material Description: Soil
Contractor's Sample ID.: PGA-SB-003-25
Date Sampled: 09 Feb 90

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	<6.5	<5000	µg/kg	1,2-Dichloropropane	<3.2	<500	µg/kg
Benzene	<3.2	<500	µg/kg	cis-1,3-Dichloropropene	<3.2	<500	µg/kg
Bromodichloromethane	<3.2	<500	µg/kg	trans-1,3-Dichloropropene	<3.2	<500	µg/kg
Bromoform	<3.2	<500	µg/kg	Ethylbenzene	<3.2	<500	µg/kg
Bromomethane	<3.2	<1000	µg/kg	2-Hexanone	<6.5	<1000	µg/kg
2-Butanone	<3.2	<5000	µg/kg	Methylene chloride	<3.2	<500	µg/kg
Carbon disulfide	<3.2	<500	µg/kg	4-Methyl-2-pentanone	<13	<1000	µg/kg
Carbon tetrachloride	<3.2	<500	µg/kg	Styrene	<3.2	<500	µg/kg
Chlorobenzene	<3.2	<500	µg/kg	1,1,2,2-Tetrachloroethane	<3.2	<500	µg/kg
Chlorodibromomethane	<3.2	<500	µg/kg	Tetrachloroethene	<3.2	<500	µg/kg
Chloroethane	<3.2	<1000	µg/kg	Toluene	38	<500	µg/kg
2-Chloroethyl vinyl ether	-	<1000	µg/kg	1,1,1-Trichloroethane	<3.2	<500	µg/kg
Chloroform	<3.2	<500	µg/kg	1,1,2-Trichloroethane	<3.2	<500	µg/kg
Chloromethane	<3.2	<1000	µg/kg	Trichloroethene	<3.2	<200	µg/kg
1,1-Dichloroethane	<3.2	<500	µg/kg	Trichlorofluoromethane	-	<500	µg/kg
1,2-Dichloroethane	<3.2	<500	µg/kg	Vinyl Acetate	<6.5	<1000	µg/kg
1,1-Dichloroethene	<3.2	<500	µg/kg	Vinyl Chloride	<3.2	<1000	µg/kg
1,2-Dichloroethene (Total)	<3.2	<500	µg/kg	Xylenes (Total)	<3.2	<500	µg/kg

COMMENTS: Data agreed.
-: Not analyzed or not reported.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QA Sample ID.: PGA-SB-004-25-QA
Contractor's Sample ID.: PGA-SB-004-25
Material Description: Soil
Date Sampled: 13 Feb 90

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	<6.5	<5000	µg/kg	1,2-Dichloropropane	<3.2	<500	µg/kg
Benzene	<3.2	<500	µg/kg	cis-1,3-Dichloropropene	<3.2	<500	µg/kg
Bromodichloromethane	<3.2	<500	µg/kg	trans-1,3-Dichloropropene	<3.2	<500	µg/kg
Bromoform	<3.2	<500	µg/kg	Ethylbenzene	<3.2	<500	µg/kg
Bromomethane	<3.2	<1000	µg/kg	2-Hexanone	<6.5	<1000	µg/kg
2-Butanone	<3.2	<5000	µg/kg	Methylene chloride	<3.2	<500	µg/kg
Carbon disulfide	<3.2	<500	µg/kg	4-Methyl-2-pentanone	<13	<1000	µg/kg
Carbon tetrachloride	<3.2	<500	µg/kg	Styrene	<3.2	<500	µg/kg
Chlorobenzene	<3.2	<500	µg/kg	1,1,2,2-Tetrachloroethane	<3.2	<500	µg/kg
Chlorodibromomethane	<3.2	<500	µg/kg	Tetrachloroethene	<3.2	<500	µg/kg
Chloroethane	<3.2	<1000	µg/kg	Toluene	<3.2	<500	µg/kg
2-Chloroethyl vinyl ether	-	<1000	µg/kg	1,1,1-Trichloroethane	<3.2	<500	µg/kg
Chloroform	<3.2	<500	µg/kg	1,1,2-Trichloroethane	<3.2	<500	µg/kg
Chloromethane	<3.2	<1000	µg/kg	Trichloroethene	<3.2 **	5100 +	µg/kg
1,1-Dichloroethane	<3.2	<500	µg/kg	Trichlorofluoromethane	-	<500	µg/kg
1,2-Dichloroethane	<3.2	<500	µg/kg	Vinyl Acetate	<6.5	<1000	µg/kg
1,1-Dichloroethene	<3.2	<500	µg/kg	Vinyl Chloride	<3.2	<1000	µg/kg
1,2-Dichloroethene (Total)	<3.2	<500	µg/kg	Xylenes (Total)	<3.2	<500	µg/kg

COMMENTS: **: major data disagreement.
+: Laboratory Duplicate (Second Bottle) showed this compound present at 8700-µg/kg.
-: Not analyzed or not reported.

F5

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QA Sample ID.: PGA-SB-005-25-QA
Contractor's Sample ID.: PGA-SB-005-25
Material Description: Soil
Date Sampled: 15 Feb 90

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	<7.0	<5000	µg/kg	1,2-Dichloropropane	<3.5	<500	µg/kg
Benzene	<3.5	<500	µg/kg	cis-1,3-Dichloropropene	<3.5	<500	µg/kg
Bromodichloromethane	<3.5	<500	µg/kg	trans-1,3-Dichloropropene	<3.5	<500	µg/kg
Bromoform	<3.5	<500	µg/kg	Ethylbenzene	<3.5	<500	µg/kg
Bromomethane	<3.5	<1000	µg/kg	2-Hexanone	<7.0	<1000	µg/kg
2-Butanone	<7.0	<5000	µg/kg	Methylene chloride	<7.0	<500	µg/kg
Carbon disulfide	<3.5	<500	µg/kg	4-Methyl-2-pentanone	<14	<1000	µg/kg
Carbon tetrachloride	<3.5	<500	µg/kg	Styrene	<3.5	<500	µg/kg
Chlorobenzene	<3.5	<500	µg/kg	1,1,2,2-Tetrachloroethane	<3.5	<500	µg/kg
Chlorodibromomethane	<3.5	<500	µg/kg	Tetrachloroethene	<3.5	<500	µg/kg
Chloroethane	<3.5	<1000	µg/kg	Toluene	<3.5	<500	µg/kg
2-Chloroethyl vinyl ether	-	<1000	µg/kg	1,1,1-Trichloroethane	<3.5	<500	µg/kg
Chloroform	<3.5	<500	µg/kg	1,1,2-Trichloroethane	<3.5	<500	µg/kg
Chloromethane	<3.5	<1000	µg/kg	Trichloroethene	<3.5	<200	µg/kg
1,1-Dichloroethane	<3.5	<500	µg/kg	Trichlorofluoromethane	-	<500	µg/kg
1,2-Dichloroethane	<3.5	<500	µg/kg	Vinyl Acetate	<7.0	<1000	µg/kg
1,1-Dichloroethene	<3.5	<500	µg/kg	Vinyl Chloride	<3.5	<1000	µg/kg
1,2-Dichloroethene (Total)	<3.5	<500	µg/kg	Xylenes (Total)	<3.5	<500	µg/kg

COMMENTS: Data agreed.
-: Not analyzed or not reported.

F6

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QA Sample ID.: PGA-SB-008-25-QA
Material Description: Soil
Contractor's Sample ID.: PGA-SB-008-25
Date Sampled: 16 Feb 90

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	<5.2	<5000	µg/kg	1,2-Dichloropropane	<2.6	<500	µg/kg
Benzene	<2.6	<500	µg/kg	cis-1,3-Dichloropropene	<2.6	<500	µg/kg
Bromodichloromethane	<2.6	<500	µg/kg	trans-1,3-Dichloropropene	<2.6	<500	µg/kg
Bromoform	<2.6	<500	µg/kg	Ethylbenzene	<2.6	<500	µg/kg
Bromomethane	<2.6	<1000	µg/kg	2-Hexanone	<5.2	<1000	µg/kg
2-Butanone	<5.2	<5000	µg/kg	Methylene chloride	<5.2	<500	µg/kg
Carbon disulfide	<2.6	<500	µg/kg	4-Methyl-2-pentanone	<10	<1000	µg/kg
Carbon tetrachloride	<2.6	<500	µg/kg	Styrene	<2.6	<500	µg/kg
Chlorobenzene	<2.6	<500	µg/kg	1,1,2,2-Tetrachloroethane	<2.6	<500	µg/kg
Chlorodibromomethane	<2.6	<500	µg/kg	Tetrachloroethene	<2.6	<500	µg/kg
Chloroethane	<2.6	<1000	µg/kg	Toluene	<2.6	<500	µg/kg
2-Chloroethyl vinyl ether	-	<1000	µg/kg	1,1,1-Trichloroethane	<2.6	<500	µg/kg
Chloroform	<2.6	<500	µg/kg	1,1,2-Trichloroethane	<2.6	<500	µg/kg
Chloromethane	<2.6	<1000	µg/kg	Trichloroethene	<2.6	<200	µg/kg
1,1-Dichloroethane	<2.6	<500	µg/kg	Trichlorofluoromethane	-	<500	µg/kg
1,2-Dichloroethane	<2.6	<500	µg/kg	Vinyl Acetate	<5.2	<1000	µg/kg
1,1-Dichloroethene	<2.6	<500	µg/kg	Vinyl Chloride	<2.6	<1000	µg/kg
1,2-Dichloroethene (Total)	<2.6	<500	µg/kg	Xylenes (Total)	<2.6	<500	µg/kg

COMMENTS: Data agreed.
-: Not analyzed or not reported.

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
QA Sample ID.: PGA-SB-007-25-QA
Material Description: Soil
Contractor's Sample ID.: PGA-SB-007-25
Date Sampled: 19 Feb 90

Analysis	QA Lab Result	Contractor Result	Units	Analysis	QA Lab Result	Contractor Result	Units
VOLATILE ORGANICS							
Acetone	<33	<5000	µg/kg	1,2-Dichloropropane	<6.6	<500	µg/kg
Benzene	<6.6	<500	µg/kg	cis-1,3-Dichloropropene	<6.6	<500	µg/kg
Bromodichloromethane	<6.6	<500	µg/kg	trans-1,3-Dichloropropene	<6.6	<500	µg/kg
Bromoform	<6.6	<500	µg/kg	Ethylbenzene	<6.6	<500	µg/kg
Bromomethane	<6.6	<1000	µg/kg	2-Hexanone	<33	<1000	µg/kg
2-Butanone	<6.6	<5000	µg/kg	Methylene chloride	<13	<500	µg/kg
Carbon disulfide	<6.6	<500	µg/kg	4-Methyl-2-pentanone	<33	<1000	µg/kg
Carbon tetrachloride	<6.6	<500	µg/kg	Styrene	<6.6	<500	µg/kg
Chlorobenzene	<6.6	<500	µg/kg	1,1,2,2-Tetrachloroethane	<6.6	<500	µg/kg
Chlorodibromomethane	<6.6	<500	µg/kg	Tetrachloroethene	<6.6	<500	µg/kg
Chloroethane	<6.6	<1000	µg/kg	Toluene	<6.6	<500	µg/kg
2-Chloroethyl vinyl ether	-	<1000	µg/kg	1,1,1-Trichloroethane	<6.6	<500	µg/kg
Chloroform	<6.6	<500	µg/kg	1,1,2-Trichloroethane	<6.6	<500	µg/kg
Chloromethane	<6.6	<1000	µg/kg	Trichloroethene	<6.6	<200	µg/kg
1,1-Dichloroethane	<6.6	<500	µg/kg	Trichlorofluoromethane	-	<500	µg/kg
1,2-Dichloroethane	<6.6	<500	µg/kg	Vinyl Acetate	<66	<1000	µg/kg
1,1-Dichloroethene	<6.6	<500	µg/kg	Vinyl Chloride	<6.6	<1000	µg/kg
1,2-Dichloroethene (Total)	<6.6	<500	µg/kg	Xylenes (Total)	<6.6	<500	µg/kg

COMMENTS: Data agreed.
-: Not analyzed or not reported.

F8

Table 8

DEPARTMENT OF THE ARMY
Missouri River Division, Corps of Engineers
Division Laboratory
Omaha, Nebraska

COMPARISON OF QA & CONTRACTOR RESULTS

Project: Phoenix-Goodyear Airport, Goodyear, Arizona
Material Description: Soil

Analysis: TOTAL ORGANIC CARBON

Split Sample ID	QA Lab Result		Contractor Result	Units	Date Sampled
PGA-SB-002-45	2000	*	<250	mg/kg	08 Feb 90
PGA-SB-003-30	4000	*	<250	mg/kg	09 Feb 90
PGA-SB-004-30	25000	**	308	mg/kg	13 Feb 90
PGA-SB-005-30	3000	*	<250	mg/kg	15 Feb 90
PGA-SB-008-30	2000	*	<250	mg/kg	16 Feb 90
PGA-SB-007-30	<1000		278	mg/kg	19 Feb 90

COMMENTS: *: Data disagreement.
**: Major data disagreement.